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Drinking Water Surveillance Program

OTTAWA (BRITANNIA) WATER TREATMENT PLANT

Annual Report 1987

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Jim Bradley, Minister

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OTTAWA (BRITANNIA)
WATER TREATMENT PLANT

DRINKING WATER SURVEILLANCE
PROGRAM

ANNUAL REPORT 1987

ONTARIO MINISTRY OF ENVIRONMENT
OCTOBER 1988

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ACKNOWLEDGEMENTS

The Drinking Water Surveillance Program (DWSP) employs a team approach requiring the co-operative effort of the Ministry of the Environment (MOE) staff from Water Resources and Laboratory Services Branch and the Regions, as well as plant operational staff from the Municipalities.

This annual report was produced by the DWSP Group (Ron Hunsinger, Peter Bohm, Carol Sackville-Duyvelshoff, Chris Fung and John McGrachan) and by Pat Lachmaniuk (on developmental assignment to the Drinking Water Section).

Helpful input and reviews were received from Drinking Water Section Staff, in addition to reviews by other MOE and municipal personnel.

EXECUTIVE SUMMARY

DRINKING WATER SURVEILLANCE PROGRAM OTTAWA (BRITANNIA) WATER TREATMENT PLANT 1987 ANNUAL REPORT

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. Currently, 44 plants are being monitored.

The Ottawa (Britannia) Water Treatment Plant is a conventional treatment plant which treats water from the Ottawa River. The Process consists of coagulation, flocculation, sedimentation, filtration, disinfection, post pH adjustment and fluoridation. This plant, in conjunction with the Lemieux Island plant, serves a population of approximately 515,000 people and has a design capacity of 247 x 1000m³/day.

Water samples at the Ottawa (Britannia) Water Treatment Plant raw and treated sites plus two distribution system sites were taken on a monthly basis and analyzed for approximately 160 parameters. Parameters were divided into the following groups Bacteriological, Inorganic and Physical (Laboratory Chemistry, Field Chemistry and Metals) and Organics (Chloroaromatics, Chlorophenols, Pesticide and PCB, Phenolics, Polynuclear Aromatic Hydrocarbons, Specific Pesticides and Volatiles). Specific Pesticides and Chlorophenols were analysed in June and November only.

A summary of results is shown in Table 1.

Due to its sampling frequency of once per month, the DWSP is not designed to evaluate all aspects of the bacteriological quality of the water; however routine bacteriological monitoring as outlined in the Ontario Drinking Water Objectives (ODWOs) is carried out by the operating authority. In terms of the limited DWSP bacteriological examination the water was of good quality.

The ODWO for Turbidity was exceeded in the treated water in January and September. The District Officer was notified. All other Inorganic and Physical parameters (Laboratory Chemistry, Field Chemistry and Metals) were below applicable health related ODWOs.

Of approximately 110 Organic parameters tested for on a monthly basis, none exceeded health related guidelines.

Many of the substances detected are naturally occurring or treatment by-products.

During 1987 the DWSP sampling results indicated that the Ottawa (Britannia) Water Treatment Plant produced good quality water at the plant and this quality was maintained throughout the distribution system.

SOMMAIRE

PROGRAMME DE SURVEILLANCE DE L'EAU POTABLE

STATION D'ÉPURATION DE L'EAU D'OTTAWA (BRITANNIA) RAPPORT ANNUEL 1987

Le Programme de surveillance de l'eau potable (PSEP) de l'Ontario fournit des informations immédiates, fiables et à jour sur la qualité de l'eau potable. Le PSEP a débuté officiellement en avril 1986. Il est destiné à englober tous les réseaux municipaux d'alimentation en eau de l'Ontario. Actuellement, 44 stations en font partie.

La station d'épuration d'Ottawa (Britannia) est une station classique qui traite l'eau de la rivière des Outaouais. Le traitement comporte la coagulation, la floculation, la décantation, la filtration, la désinfection, l'ajustement du pH et la fluoration. Cette station, avec celle de l'île Lemieux, dessert une population d'environ 515 000 habitants et a une capacité nominale de 247 x 1 000 m³/jour.

Des prélèvements d'eau brute et d'eau traitée ainsi qu'en deux points du réseau de distribution ont été effectués chaque mois et analysés par rapport à environ 160 paramètres dans les catégories suivantes : bactériologique, inorganique et physique (analyses en laboratoire et sur place, présence de métaux) et organique (composés aromatiques chlorés, chlorophénols, pesticides et BPC, dérivés phénoliques, hydrocarbures aromatiques polynucléaires, pesticides particuliers et composés volatils). Les chlorophénols et les pesticides particuliers n'ont été analysés qu'en juin et en novembre.

Le tableau 1 résume les résultats obtenus.

En raison de la fréquence des prélèvements (un par mois), le PSEP ne permet pas d'évaluer tous les aspects de la qualité bactériologique de l'eau. Cependant, comme on le recommande dans le cadre des objectifs relatifs à la qualité de l'eau potable en Ontario, un contrôle bactériologique est effectué par l'exploitant. L'analyse bactériologique limitée du PSEP a révélé une eau de bonne qualité.

Les limites fixées par l'Ontario pour la turbidité ont été dépassées dans l'eau traitée en janvier et en septembre. L'agent de district en a été avisé. Les mesures des autres paramètres inorganiques et physiques étaient inférieures aux limites applicables fixées par l'Ontario pour l'eau potable.

Pour environ 110 paramètres organiques mesurés chaque mois, aucun résultat n'a dépassé les limites acceptables fixées pour la santé.

Un grand nombre de substances détectées apparaissent naturellement ou sont des produits dérivés de l'épuration.

Les résultats des analyses effectuées en 1987 dans le cadre du PSEP ont indiqué que la station d'épuration d'Ottawa (Britannia) donnait une eau de bonne qualité et que cette qualité se maintenait dans tout le réseau de distribution.

TABLE 1

DRINKING WATER SURVEILLANCE PROGRAM BRITANNIA WATER TREATMENT PLANT

SUMMARY TABLE BY SCAN (1987)

SCAN	TREATED			SITE 1			SITE 2					
	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE
BACTERIOLOGICAL	47	47	100	48	8	16	48	10	20	44	15	34
CHEMISTRY (FLD)	38	38	100	72	72	100	137	137	100	128	128	100
CHEMISTRY (LAB)	224	190	84	224	189	84	381	331	86	377	316	83
METALS	243	124	51	243	123	50	455	212	46	471	227	48
CHLOROAROMATICS	156	0	0	156	0	0	143	0	0	156	0	0
CHLOROPHENOLS	12	0	0	6	0	0	.	.	.	.	.	.
PAH	51	0	0	68	0	0	.	.	.	.	.	.
PESTICIDES & PCB	297	0	0	297	0	0	273	0	0	295	0	0
PHENOLICS	11	2	18	11	2	18	.	.	.	.	.	.
SPECIFIC PESTICIDES	162	0	0	135	0	0	99	0	0	99	0	0
VOLATILES	337	7	2	337	37	10	338	37	10	339	37	10
TOTAL	1578	408		1597	431		1874	727		1909	723	

THE ODWO FOR TURBIDITY WAS EXCEEDED TWICE, NO OTHER HEALTH RELATED GUIDELINES/LIMITS WERE EXCEEDED

A POSITIVE VALUE DENOTES THAT THE RESULT IS GREATER THAN THE STATISTICAL LIMIT OF DETECTION AND IS QUANTIFIABLE
 A '.' INDICATES THAT NO SAMPLE WAS TAKEN

DRINKING WATER SURVEILLANCE PROGRAM

OTTAWA (BRITANNIA) WATER TREATMENT PLANT 1987 ANNUAL REPORT

INTRODUCTION

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. Currently, 44 plants are being monitored. Appendix A contains a detailed description of the DWSP.

The DWSP was initiated at the Ottawa (Britannia) Water Treatment Plant in the fall of 1986. An annual report was published for 1986 (ISBN 0-7729-2550-X).

This report contains information and results for 1987.

PLANT DESCRIPTION

The Ottawa (Britannia) Water Treatment is a conventional treatment plant which treats water from the Ottawa River. The process consists of coagulation, flocculation, sedimentation, filtration, disinfection, post pH adjustment and fluoridation. This plant, in conjunction with the Lemieux Island plant, serves a population of approximately 515,000 people. It has a design

capacity of $247.0 \times 1000\text{m}^3/\text{day}$ and daily flows ranging from $54.32 \times 1000\text{m}^3/\text{day}$ to $203 \times 1000\text{m}^3/\text{day}$.

The plant location is shown in Figure 1. Plant process details, in a block schematic, are shown in Figure 2. General plant information is presented in Table 2.

METHODS

Water samples were obtained from four DWSP approved locations;

- i) Plant Raw - The water originated from the intake pipe prior to chlorination and was sampled through a stainless line. The sample tap is located in the plant laboratory.
- ii) Plant Treated - The water originated from the highlift discharge after addition of all treatment chemicals and was sampled through a copper sample line. The sample tap is located in the plant laboratory.
- iii) Distribution System - Site 1 - This house is approximately 3 kilometers from the plant. Water was sampled, through copper plumbing, from the kitchen tap.
- iv) Distribution System - Site 2 - This house is approximately 8 kilometers from the plant. Water was sampled, through copper plumbing, from the basement laundry tap.

FIGURE 1

DRINKING WATER SURVEILLANCE PROGRAM ANNUAL REPORT

SITE LOCATION MAP

LOCATION: OTTAWA (LEMIEUX & BRITTANNIA) WATER TREATMENT PLANT



Figure 2

OTTAWA (BRITANNIA) WATER TREATMENT PLANT

OTTAWA RIVER

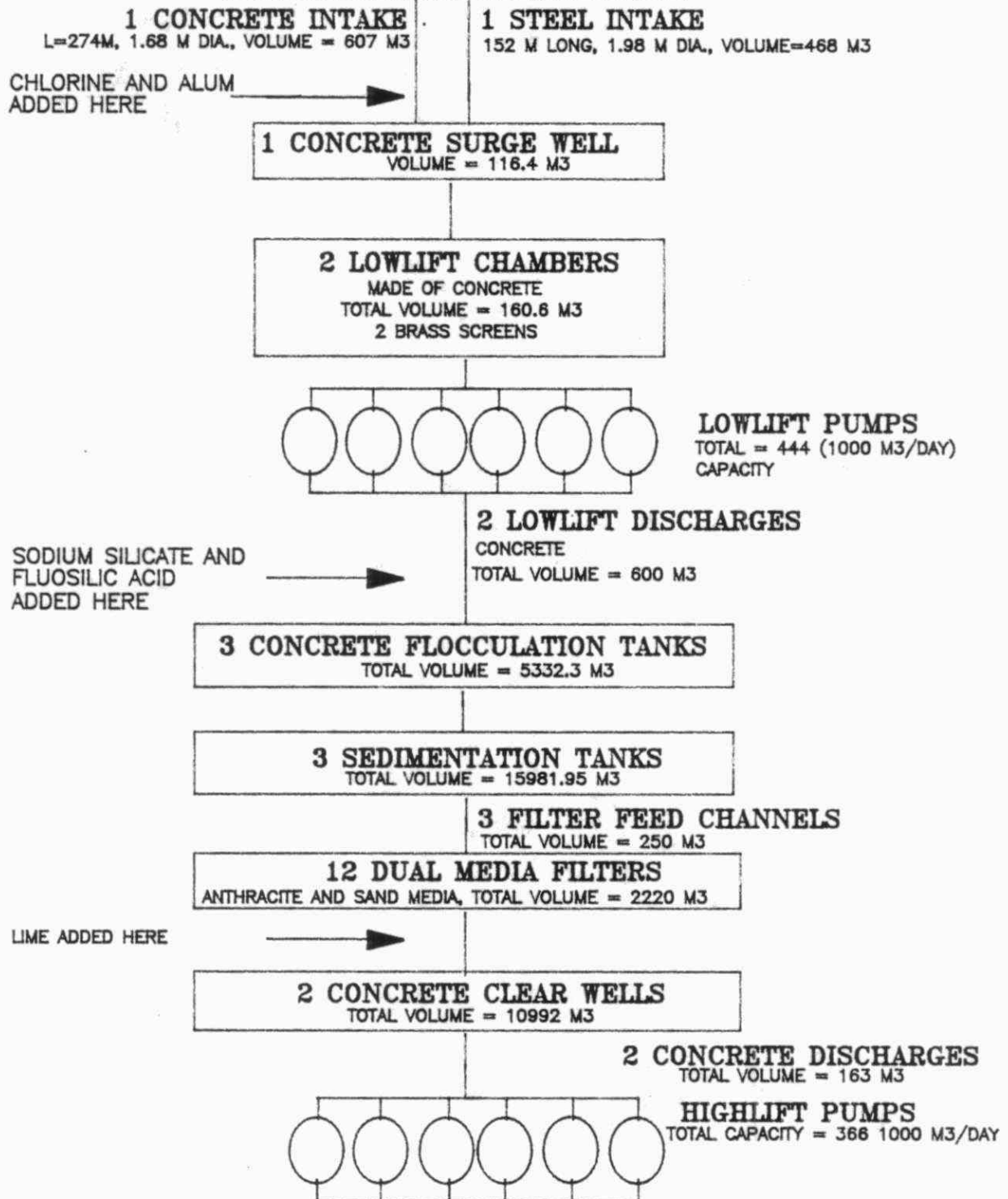


TABLE 2

DRINKING WATER SURVEILLANCE PROGRAM ANNUAL REPORT

GENERAL INFORMATION

OTTAWA (BRITANNIA) WATER TREATMENT PLANT

<u>LOCATION:</u>	CASSELS ROAD OTTAWA, ONTARIO (613-828-2727)
<u>SOURCE:</u>	RAW WATER SOURCE - OTTAWA RIVER
<u>RATED CAPACITY:</u>	247 (1000 M3/DAY)
<u>OPERATION:</u>	MUNICIPAL
<u>PLANT SUPERINTENDENT:</u>	A. HARTRY
<u>MINISTRY REGION:</u>	SOUTHEASTERN
<u>DISTRICT OFFICER:</u>	MR. R.A. DUNN

<u>MUNICIPALITY SERVED</u>	<u>POPULATION</u>
CITY OF OTTAWA	304,000
GLOUCESTER	76,589
VANIER	18,877
NEPEAN	85,737
KANATA	20,529
GOULBOURN	9,720

Sample lines in the plant were flushed prior to sampling to ensure that the water obtained was indicative of its origin and not residual water standing in the sample line.

At all distribution system locations two types of samples were obtained: a standing and a free flow. The standing sample consisted of water that had been in the household plumbing and service connection for a minimum of six hours. These samples are used to make an assessment of the amount by which the levels of inorganic compounds and metals may be changed on standing, due to leaching from (or deposition on), the plumbing system. The only analyses carried out on these samples therefore, are General Chemistry and Metals. The free flow sample represented fresh water from the distribution main that had been flowing for five minutes before being sampled.

Attempts were made to capture the same block of water at each sampling point by taking the retention time into consideration. The retention time was calculated by dividing the volume of water between the two sampling points by the sample day flow. For example, if it was determined that the retention time within the plant was five hours then there would be a five hour interval between the raw and treated sampling. Similarly, if it was estimated that it took approximately one day for the water to travel from the plant to the distribution system site, this site would be sampled one day after the treated water from the plant.

Stringent DWSP sampling protocols were followed to eliminate any variance (Appendix B).

Sample day flow, treatment chemical dosages and field measurements such as Turbidity, Chlorine Residuals, pH and Temperature were recorded on the day of sampling and were entered onto the DWSP data base as submitted.

RESULTS

The Ottawa (Britannia) Water Treatment Plant was sampled for approximately 160 parameters on a monthly basis.

The Specific Pesticides and Chlorophenols scans were sampled for in June and November only. Polynuclear Aromatic Hydrocarbons and Phenolics are only analysed for in the raw and treated water from the plant.

Table 3 contains information on the sample day retention time, flow rate and treatment chemicals used and their associated dosages.

Table 4 is a summary break-down of the number of water samples analysed for by parameter and by water type. The number of times that a positive or trace result was detected is also reported.

Positive denotes that the result is greater than the statistical limit of detection established by the Ministry of the Environment

(MOE) laboratory staff and is quantifiable. Trace (<T) denotes that the level measured is greater than the lowest value detectable by the method but lies so close to the detection limit that it cannot be confidently quantified.

Table 5 presents the results for parameters detected on at least one occasion.

Table 6 presents parameters not detected.

Associated guidelines and detection limits are also supplied on both tables. Parameters are listed alphabetically within each scan.

DISCUSSION

Water quality is judged by comparison with the Ontario Drinking Water Objectives (ODWOs) as defined in the 1984 publication (ISBN 0-7743-8985-0). The Province of Ontario has health related and aesthetic objectives for 49 parameters, these are currently under review. When an ODWO is not available guidelines/limits from other agencies are consulted. The Parameters Listing System (PALIS) recently initiated by the MOE catalogues and keeps current over 1750 guidelines for 650 parameters from agencies throughout the world.

As stated under Results, traces do not indicate quantifiable results as defined by established MOE laboratory analytical

reporting protocols. While they can be useful in trend analysis or confirmation of the presence of a specific contaminant that is repeatedly detected at these levels, the occasional finding of a trace level of a contaminant is not considered to be significant. DISCUSSION OF GUIDELINES AND LIMITS THEREFORE, IS ONLY CONDUCTED ON POSITIVE RESULTS.

Bacteriology

Positive results for the Bacteriology scan were present eight times in the treated water, ten times in the distribution system Site 1 water and fifteen times in the Site 2 water. In all cases the positive parameters were Standard Plate Count, Total Coliform and/or Total Coliform Background.

Standard Plate Count is a test used to supplement routine analysis for Coliform bacteria. The limit for Standard Plate Count (at 35°C after 48 hours) in the ODWOs is 500 organisms per mL (based on a geometric mean of 5 or more samples). High Standard Plate Counts were present in one of the free flow samples from distribution system Site 1 and two of the free flow samples from Site 2. While no indicators of unsafe water were detected, the high Standard Plate Count may be indicative of a deterioration in conditions in the distribution system. A total Chlorine Residual of at least 0.05 mg/L was detected at both sample locations in the distribution system however, water temperature became elevated during the summer months. The high

Standard Plate Counts obtained for the months of June and July probably reflect increased bacteriological growth as a result of the increased temperature.

Due to its sampling frequency of once per month, the DWSP is not designed to evaluate all aspects of the bacteriological quality of water. Routine bacteriological monitoring as recommended in the ODWOs is carried out by the operating authority. Water from the Ottawa (Britannia) Water Treatment Plant, in terms of the limited DWSP bacteriological examination, was of good quality.

Inorganic and Physical Parameters

Laboratory and Field Chemistry

The results for the Laboratory Chemistry and Field Chemistry scans were below applicable health related ODWOs except on two occasions.

The January and September treated water samples had Laboratory Turbidity values above the ODWO of 1 FTU. The values were 1.69 FTU and 3.1 FTU, respectively. These exceedences were confirmed by the elevated Field Turbidity readings. On both occasions, the District Officer was notified. The high turbidity values can be attributed to plant operations; a new supply of lime that was difficult to slake was being used; this resulted in undissolved lime in the treated water.

In June, the Field Turbidity in the treated water was 1.2 FTU, this value was not confirmed by the laboratory determinations. The reasons for discrepancies between Field and Laboratory Turbidities determinations, which have also been observed at other water supplies on DWSP, are being investigated.

Turbidity in water is caused by the presence of suspended matter such as clay, silt, colloidal particles, plankton and other microscopic organisms. The most important potential health effect of Turbidity is its interference with disinfection in the treatment plant and maintenance of a chlorine residual. The ODWO of 1 Formazin Turbidity Unit (FTU) is only applicable to treated water leaving the plant.

There are ODWOs that are set for parameters which are related to aesthetic quality rather than health. One of these is Organic Nitrogen. Organic Nitrogen is calculated by subtracting the Ammonia (Ammonium Total) value from the Total Kjeldahl Nitrogen (Nitrogen Tot Kjeld) value. In a number of treated water samples and distribution system samples Organic Nitrogen values exceeded the aesthetic ODWO of 0.15 mg/L. When Organic Nitrogen exceeds 0.15 mg/l in treated water some taste and odour problems can result.

This guideline is exceeded in most supplies. Based on the information obtained from the DWSP, which generally indicates no problems with this parameter exceedence, the guideline may be modified when the ODWOs are reviewed.

It is desirable that the Temperature of drinking water be less than 15°C; the palatability of water is enhanced by its coolness. A temperature below 15°C will tend to reduce the growth of nuisance organisms and hence minimize associated taste, colour, odour and corrosion problems. The desired ODWO was exceeded thirteen times in the treated water and the free flow distribution waters.

As part of the treatment process, Fluosilic Acid is added to the treated water (Table 3). Where fluoridation is practiced, the fluoride concentration recommended in the ODWO is 1.2 mg/L, plus or minus 0.2 mg/L. Maintenance of this level was not achieved in the treated or distribution system water as indicated by the Fluoride levels reported by the MOE laboratory which were all below 1.0 mg/L.

Calcium, Conductivity, Hardness and pH levels increased in the treated water as compared to the raw water. These increases are a result of the addition of Calcium Carbonate, in the form of lime, during the treatment process to adjust the final pH in the treated water.

Metals

The results reported for the Metals scan were below any applicable health related ODWOs.

Copper and Iron levels were generally lower in the treated water

as compared to the raw water. This is a result of the treatment process. The addition of Alum as a coagulant to the raw water and the resulting coagulation/settling process has been shown to reduce the levels of most metals.

Elevated levels of Copper and Zinc were detected in the standing samples as compared to the free flow distribution samples thus, indicating that small quantities of these metals were leached from the household plumbing as the water stood overnight.

Higher levels of lead were detected in all the standing samples from distribution system Site 2. A lead service connection is present at this location. Small quantities of lead were leached as the water stood overnight.

Mercury levels increased gradually through the year in the treated water and distribution system Site 2 water. Over the past year in the DWSP it has been observed that potassium dichromate, used to preserve Mercury samples, has a limited shelf-life and may show false positives for the presence of Mercury. As the preservative deteriorates, Mercury levels increase due to interferences and the preservatives are replaced.

At present, there is no evidence that Aluminum is physiologically harmful and no health limit has been specified. The ODWOS indicate that a useful guideline is to maintain a residual below 0.1 mg/L as Al in the water leaving the plant to avoid post precipitation problems. The measure of residual Aluminum in the

treated water is important to indicate the efficiency of the treatment process. Aluminum values marginally exceeded the ODWO operational guideline on four occasions in the treated water.

Organic Parameters

Chloroaromatics

The results of the Chloroaromatics scan showed that seven parameters were detected:

- Hexachlorobutadiene
- 1,2,3,5-Tetrachlorobenzene
- 1,2,4,-Trichlorobenzene
- 1,3,5-Trichlorobenzene
- 1,2,4,5-Tetrachlorobenzene
- Hexachloroethane
- 2,3,6-Trichlorotoluene

Hexachlorobutadiene was detected at a trace level, once in the distribution system Site 2 water.

1,2,3,5-Tetrachlorobenzene was detected at a trace level, once in the distribution system Site 1 water.

1,2,4-Trichlorobenzene was detected at a trace level, once in the distribution system Site 2 water.

1,2,4,5-Tetrachlorobenzene was detected at trace levels, once in the treated water, distribution system Site 1 water and Site

2 water.

1,3,5-Trichlorobenzene was detected at trace levels, once in the treated water and once in the distribution system Site 2 water.

Hexachloroethane was detected at trace levels, five times in the treated water and four times in both the distribution system waters.

2,3,6-Trichlorotoluene was detected at a trace level, once in the treated water.

Review of these results, along with information from other water supplies on DWSP, would indicate that certain Chloroaromatics appear more frequently in the treated water than in the raw and almost always only at trace levels. These occurrences could possibly be due to a reaction of chlorine with organics present in the water or in the distribution system.

Chlorophenols

The results of the Chlorophenols scan showed that one parameter was detected:

2,4,6-Trichlorophenol

2,4,6-Trichlorophenol was detected at a trace level once in the treated water.

Pesticides and PCB (Polychlorinated Biphenyl)

The results of the Pesticides and PCB scan showed that three pesticides were detected:

Alpha BHC

Lindane

PPDDE

Lindane consists of several isomers of BHC (Benzene Hexachloride). Alpha BHC is the isomer predominantly found in water from the Great Lakes Basin as indicated in results from other water supplies on DWSP.

Alpha BHC was detected at trace levels, six times in the raw water, eight times in the treated water and five times in the distribution system Site 1 and Site 2 waters.

Lindane was detected at trace levels, once in the raw water, once in the treated water and twice in the distribution system Site 1.

PPDDE was detected at a trace level, once in the distribution system Site 2 water. PPDDE is produced as a metabolite during the breakdown of DDT by mammals, birds, fish and microorganisms.

Specific Pesticides

Results of the Specific Pesticides scan showed that no parameters were detected.

Phenolics

Phenolics were detected at trace levels, seven times in the raw water and nine times in the treated water. Two positive results were detected in the May and June raw and treated water at 1.2 ug/L, 1.2 ug/L, 1.0 ug/L and 1.2 ug/L. All treated water values were below the aesthetic ODWO of 2.0 ug/L. Phenolic compounds are present in the aquatic environment as a result of natural and/or industrial processes.

Polynuclear Aromatic Hydrocarbons (PAH)

The results of the PAH scan showed that no PAHs were detected.

Volatiles

The results of the Volatiles scan showed that eight parameters, other than Trihalomethanes (THMs), were detected:

- Benzene
- Toluene
- Ethylbenzene
- Meta and Para-Xylene
- Ortho-Xylene
- Carbon Tetrachloride
- Tetrachloroethylene
- 1,4 Dichlorobenzene

Benzene was detected at a trace level, once in the distribution system Site 1 water.

Toluene was detected at trace levels, once in the treated water and twice in the distribution system Site 1 water.

Ethylbenzene was detected at trace levels, three times in the treated water, three times in the distribution system Site 1 water and once in the Site 2 water.

Meta and Para-Xylene are measured as one compound, M-Xylene. They were detected at a trace level, once in the distribution system Site 2 water.

Ortho-Xylene (O-Xylene) was detected once at a trace level, in the distribution system Site 2 water.

These volatiles are typically found on an occasional basis at other water supplies included on the DWSP usually at trace levels.

A positive result for Carbon Tetrachloride was detected in one raw water however, the laboratory suspected contamination as indicated by the remark code 'UCR'.

Tetrachloroethylene was detected at trace levels, once in the treated water and once in the distribution system Site 1 water.

A positive result for 1,4-Dichlorobenzene was detected once in the distribution system Site 1 water however, the laboratory suspected contamination as indicated by the remark code 'UCS'.

THMs are acknowledged to be produced during the water treatment process and will always occur in chlorinated surface waters. THMs are comprised mainly of Chloroform, Chlorodibromomethane and Dichlorobromomethane. Bromoform occurs occasionally. Results are reported for the individual compounds as well as for total THMs.

Chloroform, Dichlorobromomethane and Total THMs were detected in all treated waters. Chlorodibromomethane was detected once in the treated water and once in water from distribution system Site 2. All THM occurrences were well below the ODWO of 350 ug/l for Total THMs.

THMs were present in five of the raw water samples. This would indicate that low levels of chlorine were present in these samples.

CONCLUSIONS

The Ottawa (Britannia) Water Treatment plant for the sample year of 1987 produced good quality water at the plant and this was maintained throughout the distribution system.

No health related guidelines, for organic or inorganic parameters, were exceeded during 1987. The ODWO for Turbidity, a physical parameter, as measured in the laboratory, was exceeded on two occasions.

RECOMMENDATIONS

Three recommendations can be made and are as follows:

- 1) The data base should be reviewed in consultation with Regional, Plant and DWSP personnel to determine if sampling location, sampling frequency and the number of parameters analysed could be revised to allow for a more efficient characterization of the water.
- 2) During 1987 five raw water samples contained THMs. This sample site should be reassessed to ensure that it still meets the DWSP sampling protocol.
- 3) Fluoride dosages should be adjusted to ensure that the recommended fluoride level is maintained in the distributed water.

TABLE 3

DRINKING WATER SURVEILLANCE PROGRAM BRITANNIA WATER TREATMENT PLANT

SAMPLE DAY CONDITIONS			TREATMENT CHEMICAL DOSAGES (MG/L)							
DATE	RETENTION TIME(HRS)	FLOW (1000 M3)	PRE-CHLORINATION	COAGULATION	COAGULATION AID	FLUORIDATION		ACTIVATION	POST PH ADJUSTMENT	POST-CHLORINATION
			CHLORINE	ALUM LIQUID	SODIUM SILICATE	FLUOSILIC	ACID	ALUM LIQUID	CALCIUM CARBONATE	CHLORINE
JAN 26	4.5	109.0	1.40	36.00	1.75	.90		3.50	15.00	1.40
FEB 23	4.5	109.0	1.00	33.00	1.75	.90		3.00	16.00	1.40
MAR 23	3.5	141.0	1.00	34.00	1.75	.90			17.00	1.40
APR 27	4.0	141.0	1.00	37.00	1.75	.90		3.00		1.40
MAY 25	5.0	109.0	1.60	37.00	1.00	.90		2.00	14.00	1.40
JUN 22	3.0	186.0	2.00	33.00	1.00	.90		2.00	13.00	1.40
JUL 27	5.1	109.0	2.40	32.00	.75	.90		1.50	15.00	1.60
AUG 24	3.8	141.0	2.40	28.00	.75	.90		1.50	12.00	1.60
SEP 28	2.9	186.0	2.40	24.00	.75	.90		1.50	15.00	1.60
OCT 28	2.9	186.0	2.20	26.00	.75	.90		1.50	15.00	1.60
NOV 25	4.5	109.0	2.20	28.00	1.00	.90		1.00	13.00	1.60
DEC 16	4.5	109.0	2.00	34.00	1.50	.90		3.00	17.00	1.60

DRINKING WATER SURVEILLANCE PROGRAM BRITANNIA WATER TREATMENT PLANT

RAW WATER T

SCAN	PARAMETER	RAW WATER			TREATED WATER			SITE 1			SITE 2		
		# ANALYSED	POSITIVE	TRACE	# ANALYSED	POSITIVE	TRACE	# ANALYSED	POSITIVE	TRACE	# ANALYSED	POSITIVE	TRACE
BACTERIOLOGICAL	FECAL COLIFORM MEMBRANE FILTRATION	12	12	0	0	0	0	0	0	0	0	0	0
	P/A BOTTLE	0	0	0	12	0	0	12	0	0	11	0	0
	STANDARD PLATE COUNT MEMBRANE FILT.	11	11	0	12	7	0	12	8	0	11	10	0
	TOTAL COLIFORM BACKGROUND MF	12	12	0	12	1	0	12	2	0	11	5	0
	TOTAL COLIFORM MEMBRANE FILTRATION	12	12	0	12	0	0	12	0	0	11	0	0
*TOTAL SCAN BACTERIOLOGICAL		47	47	0	48	8	0	48	10	0	44	15	0
*TOTAL GROUP BACTERIOLOGICAL		47	47	0	48	8	0	48	10	0	44	15	0

CHEMISTRY (FLD)	FIELD COMBINED CHLORINE RESIDUAL	0	0	0	12	12	0	24	24	0	21	21	0
	FIELD FREE CHLORINE RESIDUAL	1	1	0	12	12	0	20	20	0	17	17	0
	FIELD PH	12	12	0	12	12	0	24	24	0	23	23	0
	FIELD TEMPERATURE	12	12	0	12	12	0	23	23	0	23	23	0
	FIELD TOTAL CHLORINE RESIDUAL	1	1	0	12	12	0	24	24	0	21	21	0
	FIELD TURBIDITY	12	12	0	12	12	0	22	22	0	23	23	0
*TOTAL SCAN CHEMISTRY (FLD)		38	38	0	72	72	0	137	137	0	128	128	0

CHEMISTRY (LAB)	ALKALINITY	12	12	0	12	12	0	23	23	0	23	23	0
	AMMONIUM TOTAL	12	10	1	12	5	7	24	13	7	23	3	13
	CALCIUM	12	12	0	12	12	0	23	23	0	23	23	0
	CHLORIDE	12	9	3	12	12	0	23	23	0	23	23	0
	COLOUR	12	12	0	12	10	2	23	22	1	23	20	3
	CONDUCTIVITY	12	12	0	12	12	0	23	23	0	23	23	0
	CYANIDE	9	0	0	9	0	0	9	0	0	9	0	0

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM BRITANNIA WATER TREATMENT PLANT

SUMMARY TABLE OF RESULTS (1987)

SCAN	PARAMETER	RAW WATER			TREATED WATER			SITE 1			SITE 2		
		# ANALYSED	POSITIVE	TRACE	# ANALYSED	POSITIVE	TRACE	# ANALYSED	POSITIVE	TRACE	# ANALYSED	POSITIVE	TRACE
CHEMISTRY (LAB)	FLUORIDE	12	4	8	12	12	0	23	23	0	23	23	0
	HARDNESS	12	12	0	12	12	0	23	23	0	23	23	0
	MAGNESIUM	12	12	0	12	12	0	23	23	0	23	23	0
	NITRITE	12	6	6	12	3	6	24	2	19	23	1	19
	NITROGEN TOTAL KJELDAHL	12	12	0	12	11	1	24	20	4	23	18	5
	PH	12	12	0	12	12	0	23	23	0	23	23	0
	PHOSPHORUS FIL REACT	12	12	0	12	11	1	0	0	0	0	0	0
	PHOSPHORUS TOTAL	11	7	4	11	6	5	0	0	0	0	0	0
	SODIUM	12	11	0	12	12	0	23	23	0	23	23	0
	TOTAL NITRATES	12	11	1	12	11	1	24	22	2	23	21	2
	TOTAL SOLIDS	12	12	0	12	12	0	23	23	0	23	23	0
	TURBIDITY	12	12	0	12	12	0	23	22	1	23	23	0
*TOTAL SCAN CHEMISTRY (LAB)		224	190	23	224	189	23	381	331	34	377	316	42
METALS	ALUMINUM	12	12	0	12	12	0	23	23	0	24	24	0
	ARSENIC	12	0	0	12	0	0	24	0	0	24	0	0
	BARIUM	12	12	0	12	12	0	23	23	0	24	24	0
	BERYLLIUM	12	0	0	12	0	0	23	1	0	24	0	0
	BORON	12	0	2	12	1	3	24	0	6	24	2	3
	CADMIUM	12	0	0	12	0	0	23	1	0	24	0	0
	CHROMIUM	12	8	0	12	8	0	23	7	0	24	2	0
	COBALT	12	1	0	12	1	0	23	0	0	24	1	0
	COPPER	12	12	0	12	9	0	23	23	0	24	24	0
	CYANIDE	3	0	0	3	0	0	3	0	0	3	0	0
	IRON	12	12	0	12	12	0	23	21	0	24	22	0

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM BRITANNIA WATER TREATMENT PLANT

SUMMARY TABLE OF RESULTS (1987)

SCAN	PARAMETER	RAW WATER			TREATED WATER			SITE 1			SITE 2		
		# ANALYSED	POSITIVE	TRACE	# ANALYSED	POSITIVE	TRACE	# ANALYSED	POSITIVE	TRACE	# ANALYSED	POSITIVE	TRACE
METALS	LEAD	12	2	0	12	1	0	23	6	0	24	13	0
	MANGANESE	12	12	0	12	12	0	23	23	0	24	24	0
	MERCURY	12	12	0	12	12	0	12	7	0	12	11	0
	MOLYBDENUM	12	0	0	12	0	0	23	2	0	24	1	0
	NICKEL	12	4	0	12	6	0	23	6	0	24	11	0
	SELENIUM	12	0	0	12	0	0	24	0	0	24	0	0
	STRONTIUM	12	12	0	12	12	0	23	23	0	24	24	0
	URANIUM	12	8	0	12	5	0	23	6	0	24	7	0
	VANADIUM	12	6	0	12	10	0	23	18	0	24	15	0
	ZINC	12	11	0	12	10	0	23	22	0	24	22	0
*TOTAL SCAN METALS		243	124	2	243	123	3	455	212	6	471	227	3
*TOTAL GROUP INORGANIC & PHYSICAL		505	352	25	539	384	26	973	680	40	976	671	45
CHLOROAROMATICS	123 TRICHLOROBENZENE	12	0	0	12	0	0	11	0	0	12	0	0
	1234 TETRACHLOROBENZENE	12	0	0	12	0	0	11	0	0	12	0	0
	1235 TETRACHLOROBENZENE	12	0	0	12	0	0	11	0	1	12	0	0
	124 TRICHLOROBENZENE	12	0	0	12	0	0	11	0	0	12	0	1
	1245 TETRACHLOROBENZENE	12	0	0	12	0	1	11	0	1	12	0	1
	135 TRICHLOROBENZENE	12	0	0	12	0	1	11	0	0	12	0	1
	236 TRICHLOROTOLUENE	12	0	0	12	0	1	11	0	0	12	0	0
	245 TRICHLOROTOLUENE	12	0	0	12	0	0	11	0	0	12	0	0
	26A TRICHLOROTOLUENE	12	0	0	12	0	0	11	0	0	12	0	0
	HEXACHLOROBUTADIENE	12	0	0	12	0	0	11	0	0	12	0	1
	HEXACHLOROETHANE	12	0	0	12	0	5	11	0	4	12	0	4
	OCTACHLOROSTYRENE	12	0	0	12	0	0	11	0	0	12	0	0

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM BRITANNIA WATER TREATMENT PLANT

SUMMARY TABLE OF RESULTS (1987)

SCAN	PARAMETER	RAW WATER			TREATED WATER			SITE 1			SITE 2		
		# ANALYSED	POSITIVE	TRACE	# ANALYSED	POSITIVE	TRACE	# ANALYSED	POSITIVE	TRACE	# ANALYSED	POSITIVE	TRACE
CHLOROAROMATICS	PENTACHLOROBENZENE	12	0	0	12	0	0	11	0	0	12	0	0
*TOTAL SCAN CHLOROAROMATICS		156	0	0	156	0	8	143	0	6	156	0	8
CHLOROPHENOLS	234 TRICHLOROPHENOL	2	0	0	1	0	0	0	0	0	0	0	0
	2345 TETRACHLOROPHENOL	2	0	0	1	0	0	0	0	0	0	0	0
	2356 TETRACHLOROPHENOL	2	0	0	1	0	0	0	0	0	0	0	0
	245-TRICHLOROPHENOL	2	0	0	1	0	0	0	0	0	0	0	0
	246-TRICHLOROPHENOL	2	0	0	1	0	1	0	0	0	0	0	0
	PENTACHLOROPHENOL	2	0	0	1	0	0	0	0	0	0	0	0
*TOTAL SCAN CHLOROPHENOLS		12	0	0	6	0	1	0	0	0	0	0	0
PAH	ANTHANTHRENE	0	0	0	0	0	0	0	0	0	0	0	0
	ANTHRACENE	3	0	0	4	0	0	0	0	0	0	0	0
	BENZO(A) ANTHRACENE	3	0	0	4	0	0	0	0	0	0	0	0
	BENZO (A) PYRENE	3	0	0	4	0	0	0	0	0	0	0	0
	BENZO(B) CHRYSENE	3	0	0	4	0	0	0	0	0	0	0	0
	BENZO(B) FLUORANTHENE	3	0	0	4	0	0	0	0	0	0	0	0
	BENZO(E)PYRENE	3	0	0	4	0	0	0	0	0	0	0	0
	BENZO(G,H,I) PERYLENE	3	0	0	4	0	0	0	0	0	0	0	0
	BENZO(J) FLUORANTHENE	0	0	0	0	0	0	0	0	0	0	0	0
	BENZO(K) FLUORANTHENE	3	0	0	4	0	0	0	0	0	0	0	0
	CHRYSENE	3	0	0	4	0	0	0	0	0	0	0	0
	CORONENE	3	0	0	4	0	0	0	0	0	0	0	0

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM BRITANNIA WATER TREATMENT PLANT

SUMMARY TABLE OF RESULTS (1987)

SCAN	PARAMETER	RAW WATER			TREATED WATER			SITE 1			SITE 2		
		# ANALYSED	POSITIVE	TRACE	# ANALYSED	POSITIVE	TRACE	# ANALYSED	POSITIVE	TRACE	# ANALYSED	POSITIVE	TRACE
PAH	DIBENZO(A,H) ANTHRACENE	3	0	0	4	0	0	0	0	0	0	0	0
	DIMETHYL BENZO(A) ANTHRACENE	3	0	0	4	0	0	0	0	0	0	0	0
	FLUORANTHENE	3	0	0	4	0	0	0	0	0	0	0	0
	INDENO(1,2,3-C,D) PYRENE	3	0	0	4	0	0	0	0	0	0	0	0
	PERYLENE	3	0	0	4	0	0	0	0	0	0	0	0
	PHENANTHRENE	3	0	0	4	0	0	0	0	0	0	0	0
	PYRENE	3	0	0	4	0	0	0	0	0	0	0	0
*TOTAL SCAN PAH		51	0	0	68	0	0	0	0	0	0	0	0
PESTICIDES & PCB	ALACHLOR	12	0	0	12	0	0	11	0	0	11	0	0
	ALDRIN	12	0	0	12	0	0	11	0	0	12	0	0
	ALPHA BHC	12	0	6	12	0	8	11	0	5	12	0	5
	ALPHA CHLORDANE	12	0	0	12	0	0	11	0	0	12	0	0
	ATRATONE	12	0	0	12	0	0	11	0	0	11	0	0
	BETA BHC	12	0	0	12	0	0	11	0	0	12	0	0
	DICHLORODIPHENYLDICHLOROETHANE	12	0	0	12	0	0	11	0	0	12	0	0
	DIELDRIN	12	0	0	12	0	0	11	0	0	12	0	0
	ENDRIN	12	0	0	12	0	0	11	0	0	12	0	0
	ETHYLENE DIBROMIDE	9	0	0	9	0	0	9	0	0	9	0	0
	GAMMA CHLORDANE	12	0	0	12	0	0	11	0	0	12	0	0
	HEPTACHLOR	12	0	0	12	0	0	11	0	0	12	0	0
	HEPTACHLOR EPOXIDE	12	0	0	12	0	0	11	0	0	12	0	0
	HEXACHLOROBENZENE	12	0	0	12	0	0	11	0	0	12	0	0
	LINDANE	12	0	1	12	0	1	11	0	0	12	0	2
	METHOXYCHLOR	12	0	0	12	0	0	11	0	0	12	0	0

DRINKING WATER SURVEILLANCE PROGRAM BRITANNIA WATER TREATMENT PLANT

RAW WATER I

[illegible]

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM BRITANNIA WATER TREATMENT PLANT

SUMMARY TABLE OF RESULTS (1987)

SCAN	PARAMETER	RAW WATER			TREATED WATER			SITE 1			SITE 2		
		# ANALYSED	POSITIVE	TRACE	# ANALYSED	POSITIVE	TRACE	# ANALYSED	POSITIVE	TRACE	# ANALYSED	POSITIVE	TRACE
SPECIFIC PESTICIDES	BLADEX	12	0	0	12	0	0	11	0	0	11	0	0
	BUX (METALKAMATE)	2	0	0	1	0	0	0	0	0	0	0	0
	CARBOFURAN	2	0	0	1	0	0	0	0	0	0	0	0
	DIALATE	2	0	0	1	0	0	0	0	0	0	0	0
	DIAZINON	2	0	0	1	0	0	0	0	0	0	0	0
	DICAMBA	2	0	0	1	0	0	0	0	0	0	0	0
	DICHLOROVOS	2	0	0	1	0	0	0	0	0	0	0	0
	DURSBAN	2	0	0	1	0	0	0	0	0	0	0	0
	EPTAM	2	0	0	1	0	0	0	0	0	0	0	0
	ETHION	2	0	0	1	0	0	0	0	0	0	0	0
	GUTHION	0	0	0	0	0	0	0	0	0	0	0	0
	IPC	2	0	0	1	0	0	0	0	0	0	0	0
	MALATHION	2	0	0	1	0	0	0	0	0	0	0	0
	METHYL PARATHION	2	0	0	1	0	0	0	0	0	0	0	0
	METHYLTRITHION	2	0	0	1	0	0	0	0	0	0	0	0
	METOLACHLOR	12	0	0	12	0	0	11	0	0	11	0	0
	MEVINPHOS	2	0	0	1	0	0	0	0	0	0	0	0
	PARATHION	2	0	0	1	0	0	0	0	0	0	0	0
	PHORATE (THIMET)	2	0	0	1	0	0	0	0	0	0	0	0
	PICHLORAM	0	0	0	0	0	0	0	0	0	0	0	0
	PROMETONE	12	0	0	12	0	0	11	0	0	11	0	0
	PROMETRYNE	12	0	0	12	0	0	11	0	0	11	0	0
	PROPAZINE	12	0	0	12	0	0	11	0	0	11	0	0
	PROPOXUR	2	0	0	1	0	0	0	0	0	0	0	0
	RELDAN	2	0	0	1	0	0	0	0	0	0	0	0
	RONNEL	2	0	0	1	0	0	0	0	0	0	0	0
	SENCOR	12	0	0	12	0	0	11	0	0	11	0	0

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM BRITANNIA WATER TREATMENT PLANT

SUMMARY TABLE OF RESULTS (1987)

SCAN	PARAMETER	RAW WATER			TREATED WATER			SITE 1			SITE 2		
		# ANALYSED	POSITIVE	TRACE	# ANALYSED	POSITIVE	TRACE	# ANALYSED	POSITIVE	TRACE	# ANALYSED	POSITIVE	TRACE
SPECIFIC PESTICIDES	SEVIN (CARBARYL)	2	0	0	1	0	0	0	0	0	0	0	0
	SILVEX	2	0	0	1	0	0	0	0	0	0	0	0
	SIMAZINE	12	0	0	12	0	0	11	0	0	11	0	0
	SUTAN (BUTYLATE)	2	0	0	1	0	0	0	0	0	0	0	0
	TOXAPHENE	0	0	0	0	0	0	0	0	0	0	0	0
*TOTAL SCAN SPECIFIC PESTICIDES		162	0	0	135	0	0	99	0	0	99	0	0
VOLATILES	1,1 DICHLOROETHANE	12	0	0	12	0	0	12	0	0	12	0	0
	1,1 DICHLOROETHYLENE	12	0	0	12	0	0	12	0	0	12	0	0
	1,2 DICHLOROBENZENE	12	0	0	12	0	0	12	0	0	12	0	0
	1,2 DICHLOROETHANE	12	0	0	12	0	0	12	0	0	12	0	0
	1,2 DICHLOROPROPANE	12	0	0	12	0	0	12	0	0	12	0	0
	1,3 DICHLOROBENZENE	12	0	0	12	0	0	12	0	0	12	0	0
	1,4 DICHLOROBENZENE	12	0	0	12	0	0	12	1	0	12	0	0
	111, TRICHLOROETHANE	12	0	0	12	0	0	12	0	0	12	0	0
	112 TRICHLOROETHANE	12	0	0	12	0	0	12	0	0	12	0	0
	1122 TETRA-CHLOROETHANE	12	0	0	12	0	0	12	0	0	12	0	0
	BENZENE	12	0	0	12	0	0	12	0	1	12	0	0
	BROMOFORM	12	0	0	12	0	0	12	0	0	12	0	0
	CARBON TETRACHLORIDE	12	1	0	12	0	0	12	0	0	12	0	0
	CHLOROBENZENE	12	0	0	12	0	0	12	0	0	12	0	0
	CHLORODIBROMOMETHANE	12	0	0	12	1	0	12	0	0	12	1	0
	CHLOROFORM	12	1	4	12	12	0	12	12	0	12	12	0
	DICHLOROBROMOMETHANE	12	0	0	12	12	0	12	12	0	12	12	0
	ETHYLENE DIBROMIDE	3	0	0	3	0	0	3	0	0	3	0	0

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM BRITANNIA WATER TREATMENT PLANT

SUMMARY TABLE OF RESULTS (1987)

SCAN	PARAMETER	RAW WATER			TREATED WATER			SITE 1			SITE 2		
		# ANALYSED	POSITIVE	TRACE	# ANALYSED	POSITIVE	TRACE	# ANALYSED	POSITIVE	TRACE	# ANALYSED	POSITIVE	TRACE
VOLATILES	ETHYLBENZENE	12	0	0	12	0	3	12	0	3	12	0	1
	M-XYLENE	12	0	0	12	0	0	12	0	0	12	0	1
	METHYLENE CHLORIDE	10	0	0	10	0	0	11	0	0	12	0	0
	O-XYLENE	12	0	0	12	0	0	12	0	0	12	0	1
	P-XYLENE	12	0	0	12	0	0	12	0	0	12	0	0
	TETRACHLOROETHYLENE	12	0	0	12	0	1	12	0	1	12	0	0
	TOLUENE	12	0	0	12	0	1	12	0	2	12	0	0
	TOTAL TRIHALOMETHANES	12	5	0	12	12	0	12	12	0	12	12	0
	TRANS 1,2 DICHLOROETHYLENE	12	0	0	12	0	0	12	0	0	12	0	0
	TRICHLOROETHYLENE	12	0	0	12	0	0	12	0	0	12	0	0
	TRIFLUOROCHLOROTOLUENE	12	0	0	12	0	0	12	0	0	12	0	0
*TOTAL SCAN VOLATILES		337	7	4	337	37	5	338	37	7	339	37	3
*TOTAL GROUP ORGANIC		1026	9	18	1010	39	32	853	37	18	889	37	19
TOTAL		1578	408	43	1597	431	58	1874	727	58	1909	723	64

KEY TO TABLES 5 AND 6

- A ONTARIO DRINKING WATER OBJECTIVES
1. Maximum Acceptable Concentration (MAC)
 - 1+. MAC for Total Trihalomethanes
 - 1*. MAC for Bacteriological Analyses
Poor water quality is indicated when :
 - total coliform counts $> 0 < 5$
 - P/A Bottle Test is present after 48 hours
 - Aeromonas organisms are detected in more than 25% of samples in a single submission or in successive submissions from the same sampling site
 - Pseudomonas Aeruginosa, Staphylococcus Aureus and members of the Fecal Streptococcus group should not be detected in any sample
 - Standard Plate Count should not exceed 500 organisms per ml at 35 deg C within 48 hours
 2. Interim Maximum Acceptable Concentration (IMAC)
 3. Maximum Desirable Concentration (MDC)
 4. Aesthetic or Recommended Operational Guideline
 - hardness levels between 80 and 100 mg/L as calcium carbonate are considered to provide an acceptable balance between corrosion and incrustation, water supplies with a hardness > 200 mg/L are considered poor and those in excess of 500 mg/L are unacceptable.
- B HEALTH & WELFARE CANADA
1. Maximum Acceptable Concentration (MAC)
 2. Proposed MAC
 3. Interim MAC
- C WORLD HEALTH ORGANIZATION
1. Guideline Value (GV)
 2. Tentative GV
 3. Aesthetic GV
- D US ENVIRONMENTAL PROTECTION AGENCY (EPA)
1. Maximum Contaminant Level (MCL)
 2. Suggested No-Adverse Effect Level (SNAEL)
 3. Lifetime Health Advisory
 4. EPA Ambient Water Quality Criteria
- F EUROPEAN ECONOMIC COMMUNITY (EEC)
1. Health Related Guideline Level
 2. Aesthetic Guideline Level
 3. Maximum Admissible Concentration (MADC)
- G CALIFORNIA STATE DEPARTMENT OF HEALTH-GUIDELINE VALUE
- H USSR MAXIMUM PERMISSIBLE CONCENTRATION
- I NEW YORK STATE AMBIENT WATER GUIDELINE

LABORATORY RESULTS, REMARK DESCRIPTIONS

.	No Sample Taken
BDL	Below Minimum Measurable Amount
<T	Greater Than Detection Limit But Not Confident
>	Results Are Greater Than The Upper Limit
<=>	Approximate Result
!AW	No Data: Analysis Withdrawn
!CR	No Data: Could Not Confirm By Reanalysis
!CS	No Data: Contamination Suspected
!IL	No Data: Sample Incorrectly Labelled
!IS	No Data: Insufficient Sample
!LA	No Data: Laboratory Accident
!LD	No Data: Test Queued After Sample Discarded
!NA	No Data: No Authorization To Perform Reanalysis
!NP	No Data: No Procedure
!NR	No Data: Sample Not Received
!OP	No Data: Obscured Plate
!PE	No Data: Procedural Error - Sample Discarded
!PH	No Data: Sample pH Outside Valid Range
!RO	No Data: See Attached Report (no numeric results)
!SM	No Data: Sample Missing
!SS	No Data: Send Separate Sample Properly Preserved
!UI	No Data: Indeterminant Interference
A3C	Approximate, Total Count Exceeded 300 Colonies
APL	Additional Peak, Large, Not Priority Pollutant
APS	Additional Peak, Less Than, Not Priority Pollutant
CIC	Possible Contamination, Improper Cap
CRO	Calculated Result Only
PPS	Test Performed On Preserved Sample

RMP	P and M-Xylene Not Separated
RRV	Rerun Verification
RVU	Reported Value Unusual
SPS	Several Peaks, Small, Not Priority Pollutant
UAL	Unreliable: Sample Age Exceeds Normal Limit
UCR	Unreliable: Could Not Confirm By Reanalysis
UCS	Unreliable: Contamination Suspected
UIN	Unreliable: Indeterminant Interference
XP	Positive After X Number of Hours

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM BRITANNIA WATER TREATMENT PLANT 1987

WATER TREATMENT PLANT			DISTRIBUTION SYSTEM			
TREATED			SITE 1		SITE 2	
			STANDING	FREE FLOW	STANDING	FREE FLOW
BACTERIOLOGICAL						
FECAL COLIFORM MF (CT/100ML)		DET'N LIMIT = 0		GUIDELINE = 0		(A1)
JAN	24	.	.	.	.	.
FEB	26	.	.	.	.	.
MAR	6	.	.	.	.	.
APR	15	.	.	.	.	.
MAY	10	.	.	.	.	.
JUN	7	.	.	.	.	.
JUL	12	.	.	.	.	.
AUG	181	.	.	.	.	.
SEP	179	.	.	.	.	.
OCT	158	.	.	.	.	.
NOV	70	.	.	.	.	.
DEC	30	.	.	.	.	.
STANDRD PLATE CNT MF (CT/ML)		DET'N LIMIT = 0		GUIDELINE = 500/ML		(A1)
JAN	1080	0	.	0	.	0
FEB	1800	0	.	1	.	21
MAR	2400 >	0	.	0	.	9
APR	113	1	.	0	.	7
MAY	85	0	.	1	.	10
JUN	2400 >	3	.	2400 >	.	2400 >
JUL	660	2	.	2	.	1920
AUG	99	2	.	5	.	6
SEP	10P	1	.	0	.	10
OCT	530	1	.	2	.	1LA
NOV	770	2	.	1	.	25
DEC	2100	0	.	1	.	6
P/A BOTTLE (0=ABSENT)		DET'N LIMIT = 0		GUIDELINE = 0		(A1*)
JAN	.	0	.	0	.	0
FEB	.	0	.	0	.	0
MAR	.	0	.	0	.	0
APR	.	0	.	0	.	0
MAY	.	0	.	0	.	0
JUN	.	0	.	0	.	1LA
JUL	.	0	.	0	.	0
AUG	.	0	.	0	.	0
SEP	.	0	.	0	.	0
OCT	.	0	.	0	.	0
NOV	.	0	.	0	.	0
DEC	.	0	.	0	.	0
TOTAL COLIFORM MF (CT/100ML)		DET'N LIMIT = 0		GUIDELINE = 5/100ML(A1)		
JAN	176 A3C	0	.	0	.	0

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM BRITANNIA WATER TREATMENT PLANT 1987

WATER TREATMENT PLANT			DISTRIBUTION SYSTEM			
SITE TYPE	TREATED		SITE 1		SITE 2	
			STANDING	FREE FLOW	STANDING	FREE FLOW
FEB	138 A3C	0	.	0	.	0
MAR	100 A3C	0	.	0	.	0
APR	53 A3C	0	.	0	.	0
MAY	100	0	.	0	.	0
JUN	30 A3C	0	.	0	.	0
JUL	12 A3C	0	.	0	.	0
AUG	500	0	.	0	.	0
SEP	600	0	.	0	.	0
OCT	900	0	.	0	.	!LA
NOV	400	0	.	0	.	0
DEC	66	0	.	0	.	0
T COLIFORM BCKGRD MF (CT/100ML)			DET'N LIMIT = 0		GUIDELINE = N/A	
JAN	242	0	.	0	.	0
FEB	28000	0	.	0	.	0
MAR	69000	4	.	5	.	0
APR	560	0	.	0	.	19
MAY	1500	0	.	0	.	60
JUN	2400 >	0	.	0	.	230
JUL	2400 >	0	.	0	.	164
AUG	10900	0	.	0	.	11
SEP	5500	0	.	0	.	0
OCT	7500	0	.	1	.	!LA
NOV	2400	0	.	0	.	0
DEC	140	0	.	0	.	0

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM BRITANNIA WATER TREATMENT PLANT 1987

WATER TREATMENT PLANT				DISTRIBUTION SYSTEM		
SITE		TREATED	SITE 1		SITE 2	
TYPE			STANDING	FREE FLOW	STANDING	FREE FLOW

CHEMISTRY (FLD)						
FLD CHLORINE (COMB) (MG/L)			DET'N LIMIT = N/A	GUIDELINE =	N/A	
JAN	.	.200	.100	.100	.100	.100
FEB	.	.250	.100	.050	.100	.050
MAR	.	.150	.100	.100	.100	.050
APR	.	.450	.100	.050	.100	.050
MAY	.	.050	.050	.100	.	.
JUN	.	.250	.100	.100	.100	.100
JUL	.	.300	.100	.100	.100	.100
AUG	.	.400	.100	.050	.100	.100
SEP	.	.100	.050	.100	.050	.100
OCT	.	.300	.100	.150	.100	.050
NOV	.	.300	.100	.100	.	.100
DEC	.	.100	.100	.200	.100	.100

FLD CHLORINE FREE (MG/L)			DET'N LIMIT = N/A	GUIDELINE =	N/A	
JAN	.	1.400	.100	.150	.100	.100
FEB	.	.900	.100	.100	.100	.100
MAR	.	1.500	.100	.100	.100	.100
APR	.	.950	.100	.200	.100	.100
MAY	.	1.350	.	.100	.	.
JUN	.	1.150	.100	.100	.100	.100
JUL	.100	1.300	.100	.100	.100	.100
AUG	.	1.200	.100	.100	.100	.100
SEP	.	.600	.	.100	.	.
OCT	.	1.400	.	.200	.	.100
NOV	.	1.100	.	.150	.	.
DEC	.	1.600	.100	.400	.100	.150

TOTAL CHLORINE (MG/L)			DET'N LIMIT = N/A	GUIDELINE =	N/A	
JAN	.	1.600	2.500	.250	.100	.150
FEB	.	1.150	.100	.150	.100	.050
MAR	.	1.650	.100	.200	.100	.150
APR	.	1.400	.100	.250	.100	.150
MAY	.	1.400	.050	.200	.	.
JUN	.	1.450	.100	.200	.100	.100
JUL	.100	1.600	.100	.100	.100	.100
AUG	.	1.600	.100	.150	.100	.100
SEP	.	1.700	.050	.200	.050	.100
OCT	.	1.700	.100	.350	.100	.150
NOV	.	1.400	.100	.250	.	.100
DEC	.	1.700	.100	.600	.100	.250

FLD PH (DMSNLESS)			DET'N LIMIT = N/A	GUIDELINE = 6.5-8.5 (A4)		
JAN	7.300	8.100	7.500	7.500	7.900	8.100

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM BRITANNIA WATER TREATMENT PLANT 1987

WATER TREATMENT PLANT			DISTRIBUTION SYSTEM			
SITE TYPE	TREATED		SITE 1		SITE 2	
			STANDING	FREE FLOW	STANDING	FREE FLOW
FEB	6.900	8.300	7.500	7.500	7.700	8.100
MAR	7.300	7.840	7.900	8.100	7.900	7.900
APR	7.300	7.500	7.500	7.700	7.400	7.700
MAY	7.300	8.100	7.700	7.500	7.500	.
JUN	7.300	7.500	7.500	7.300	7.500	7.700
JUL	7.400	7.600	7.700	7.500	7.700	7.900
AUG	7.500	7.600	7.300	7.700	7.500	7.500
SEP	7.300	7.900	7.900	8.000	8.100	8.300
OCT	7.300	7.600	7.700	7.400	7.700	7.700
NOV	7.300	8.400	7.900	8.000	7.700	8.100
DEC	7.300	8.400	7.500	7.500	7.700	7.900

TEMPERATURE (DEG.C)		DET'N LIMIT = N/A		GUIDELINE =		N/A
JAN	3.500	3.000	.	9.000	20.000	16.000
FEB	4.000	2.000	24.000	8.000	20.000	5.000
MAR	8.000	2.200	25.000	8.000	19.000	5.000
APR	12.500	11.200	24.000	11.000	22.000	9.000
MAY	15.000	14.100	24.000	12.000	21.000	.
JUN	25.100	21.500	24.000	15.000	16.000	22.000
JUL	26.200	25.500	24.000	17.500	22.000	19.000
AUG	21.600	21.000	23.000	18.000	22.000	20.000
SEP	16.500	17.000	23.000	17.000	22.000	18.000
OCT	10.600	9.100	27.000	17.000	25.000	15.000
NOV	5.900	2.400	24.000	13.000	22.000	12.000
DEC	4.000	1.600	27.000	13.000	24.000	10.000

FLD TURBIDITY (FTU)		DET'N LIMIT = N/A		GUIDELINE = 1.0		(A1)
JAN	1.900	1.050	.	.	.380	.320
FEB	2.300	.460	.360	.220	.250	.400
MAR	.300	.530	.150	.210	.180	.210
APR	2.600	.600	.220	.150	.150	.130
MAY	2.100	.600	.150	.180	.200	.
JUN	1.650	1.200	.430	.380	.220	.150
JUL	2.600	.600	.290	.300	.350	.330
AUG	3.000	.450	.160	.220	.250	.180
SEP	2.500	4.000	.230	.200	.370	.220
OCT	5.100	.480	.250	.230	.280	.250
NOV	6.000	.630	.200	.150	.240	.150
DEC	2.200	.660	.120	.120	.170	.130

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM BRITANNIA WATER TREATMENT PLANT 1987

WATER TREATMENT PLANT			DISTRIBUTION SYSTEM			
SITE		TREATED	SITE 1	SITE 2		
TYPE			STANDING	FREE FLOW	STANDING	FREE FLOW

CHEMISTRY (LAB)						
ALKALINITY (MG/L)		DET'N LIMIT = .200		GUIDELINE = 30-500 (A4)		
JAN	28.100	33.300	30.600	29.800	33.200	32.500
FEB	25.500	32.200	31.800	30.900	31.800	31.000
MAR	33.200	38.800	36.200	36.000	36.300	35.500
APR	27.500	26.200	32.200	31.600	30.100	30.400
MAY	25.500	29.200	28.200	27.100	29.300	28.900
JUN	30.000	29.000	31.400	30.800	29.400	30.400
JUL	21.900	22.500	25.400	24.700	27.200	27.300
AUG	20.100	20.900	23.700	22.600	24.200	23.800
SEP	20.200	21.000	25.400	24.500	25.500	25.800
OCT	21.700	22.400	25.000	!!S	27.100	25.300
NOV	22.100	25.300	26.300	26.300	!!S	26.000
DEC	28.800	33.100	32.700	29.200	31.900	31.800

CALCIUM (MG/L)		DET'N LIMIT = .100		GUIDELINE = 100. (F2)		
JAN	10.300	21.100	20.000	19.800	20.400	20.800
FEB	9.500	20.800	20.400	20.000	20.500	20.100
MAR	12.200	23.500	23.200	22.500	22.600	22.700
APR	10.700	18.200	19.700	19.700	19.600	19.800
MAY	9.200	20.600	20.800	19.800	21.000	20.800
JUN	10.600	19.400	20.200	20.200	20.000	20.600
JUL	8.800	17.000	17.600	17.200	18.800	18.800
AUG	7.200	14.600	15.200	15.400	18.400	17.600
SEP	10.400	16.600	18.000	17.400	18.000	18.000
OCT	7.400	15.200	17.000	!!S	17.600	17.600
NOV	8.800	16.200	17.600	18.000	!!S	17.800
DEC	10.200	22.200	21.000	20.800	21.800	21.600

CHLORIDE (MG/L)		DET'N LIMIT = .200		GUIDELINE = 250.0 (A3)		
JAN	2.000 <T	4.500	4.500	5.500	4.500	4.500
FEB	2.500	4.000	4.000	4.000	4.000	4.000
MAR	3.500	5.500	5.500	5.000	5.000	5.000
APR	2.000 <T	4.500	4.500	4.000	4.500	4.000
MAY	2.000 <T	4.500	5.000	4.500	4.500	4.500
JUN	2.500	5.500	5.500	5.500	6.000	6.000
JUL	3.000	6.000	6.500	6.000	6.000	6.000
AUG	2.500	5.500	6.000	6.000	5.500	5.500
SEP	3.000	6.500	6.500	6.500	6.500	6.500
OCT	3.300	6.400	6.700	!!S	6.400	6.300
NOV	3.200	6.000	6.100	6.100	!!S	6.200
DEC	3.500	6.300	6.600	6.200	6.800	6.800

COLOUR (TCU)		DET'N LIMIT = .5		GUIDELINE = 5.0 (A3)		
JAN	35.000	4.500	3.500	3.000	3.500	3.500

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM BRITANNIA WATER TREATMENT PLANT 1987

WATER TREATMENT PLANT			DISTRIBUTION SYSTEM			
SITE TYPE	TREATED	SITE 1		SITE 2		
		STANDING	FREE FLOW	STANDING	FREE FLOW	
FEB	32.000	4.000	5.000	5.000	5.000	4.500
MAR	31.000	2.500 <T	4.000	4.000	3.500	3.500
APR	35.000	3.000	3.000	3.500	3.500	1.000 <T
MAY	29.000	3.000	2.000 <T	3.000	3.000	2.000 <T
JUN	32.500	2.500	2.500	2.500	2.000	2.000 <T
JUL	28.500	2.500	3.000	2.500	3.000	3.000
AUG	24.000	2.000 <T	2.500	2.500	2.500	2.500
SEP	26.500	5.000	3.500	3.500	3.500	3.500
OCT	30.000	2.500	3.500	!IS	3.500	3.500
NOV	34.500	3.500	4.500	4.500	!IS	4.000
DEC	31.000	3.000	3.000	2.500	3.500	3.000

CONDUCTIVITY (UMHO/CM)		DET'N LIMIT = 1		GUIDELINE = 400. (F2)		
JAN	86	153	150	148	153	151
FEB	79	143	143	140	142	140
MAR	102	165	164	160	161	160
APR	82	138	144	143	143	143
MAY	81	147	140	143	143	147
JUN	90	144	148	147	145	147
JUL	76	132	136	135	140	139
AUG	71	121	125	123	125	126
SEP	74	120	127	126	126	127
OCT	80	126	135	!IS	137	134
NOV	81	133	137	136	!IS	136
DEC	96	160	157	153	158	156

FLUORIDE (MG/L)		DET'N LIMIT = .01		GUIDELINE = 2.400 (A1)		
JAN	.060	.850	.900	.900	.910	.920
FEB	.050 <T	.800	.810	.800	.820	.830
MAR	.050 <T	.810	.790	.780	.800	.800
APR	.060	.870	.900	.920	.860	.820
MAY	.050 <T	.890	.870	.830	.820	.850
JUN	.050 <T	.960	.950	.950	.940	.970
JUL	.090	.900	.850	.860	.850	.850
AUG	.050 <T	.850	.860	.870	.820	.840
SEP	.080	.680	.740	.740	.780	.800
OCT	.040 <T	.800	.800	!IS	.820	.820
NOV	.040 <T	.820	.840	.840	!IS	.800
DEC	.020 <T	.760	.740	.740	.760	.760

HARDNESS (MG/L)		DET'N LIMIT = .500		GUIDELINE = 80-100 (A4)		
JAN	35.500	63.000	60.000	59.500	61.000	62.000
FEB	33.500	62.000	60.500	59.500	61.000	60.000
MAR	40.500	69.000	67.500	67.000	65.500	66.000

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM BRITANNIA WATER TREATMENT PLANT 1987

WATER TREATMENT PLANT			DISTRIBUTION SYSTEM			
SITE TYPE		TREATED	SITE 1		SITE 2	
			STANDING	FREE FLOW	STANDING	FREE FLOW
APR	38.500	56.500	59.500	60.500	59.500	60.000
MAY	33.000	62.000	62.000	60.000	62.000	62.000
JUN	37.000	59.000	60.000	61.000	60.000	61.000
JUL	31.000	52.000	53.000	52.000	55.000	55.000
AUG	25.000	44.000	46.000	45.000	56.000	55.000
SEP	36.000	52.000	55.000	54.000	55.000	55.000
OCT	26.000	47.000	51.000	!!S	52.000	52.000
NOV	30.000	49.000	52.000	54.000	!!S	53.000
DEC	36.000	68.000	63.000	63.000	65.000	65.000
MAGNESIUM (MG/L)		DET'N LIMIT = .050		GUIDELINE = 30. (F2)		
JAN	2.400	2.550	2.500	2.450	2.400	2.450
FEB	2.400	2.400	2.400	2.400	2.300	2.400
MAR	2.500	2.500	2.300	2.600	2.200	2.300
APR	2.800	2.600	2.500	2.800	2.500	2.500
MAY	2.400	2.700	2.400	2.500	2.400	2.500
JUN	2.400	2.500	2.500	2.500	2.400	2.300
JUL	2.200	2.300	2.300	2.200	1.900	2.000
AUG	1.800	1.900	1.800	1.800	2.600	2.500
SEP	2.400	2.500	2.500	2.500	2.300	2.400
OCT	1.900	2.100	2.100	!!S	2.000	2.000
NOV	1.900	2.100	2.100	2.200	!!S	2.000
DEC	2.700	3.000	2.700	2.700	2.600	2.600
SODIUM (MG/L)		DET'N LIMIT = .200		GUIDELINE = 200. (C3)		
JAN	2.400	2.900	2.900	2.700	3.300	3.200
FEB	2.700	3.300	3.400	3.500	3.400	3.200
MAR	3.400	6.900	3.600	3.500	3.600	3.400
APR	2.200	2.700	2.800	2.600	2.700	2.700
MAY	BDL	3.800	3.800	3.600	4.200	2.600
JUN	3.000	3.200	3.000	3.000	2.600	2.800
JUL	2.800	2.800	3.000	3.000	2.800	2.800
AUG	2.400	2.600	2.800	2.400	3.200	3.000
SEP	3.200	3.800	3.400	4.200	3.800	3.600
OCT	3.400	3.600	3.400	!!S	3.400	3.400
NOV	3.600	3.800	3.800	3.800	!!S	3.800
DEC	3.200	3.600	3.800	3.600	3.800	3.800
AMMONIUM TOTAL (MG/L)		DET'N LIMIT = 0.002		GUIDELINE = .05 (F2)		
JAN	.038	.010	.016	.002 <T	BDL	BDL
FEB	.080	.032	.050	.010	.008 <T	.008 <T
MAR	.062	.028	.012	.028	.010	.014
APR	.026	.006 <T	.010	.006 <T	BDL	.002 <T
MAY	.024	.006 <T	.002 <T	BDL	.002 <T	.002 <T

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM BRITANNIA WATER TREATMENT PLANT 1987

WATER TREATMENT PLANT			DISTRIBUTION SYSTEM			
SITE TYPE	TREATED	SITE 1		SITE 2		
		STANDING	FREE FLOW	STANDING	FREE FLOW	
JUN	.008 <T	.012	.012	.010	.008 <T	.008 <T
JUL	.028	.002 <T	BDL	BDL	BDL	BDL
AUG	BDL	.004 <T	.002 <T	.004 <T	.002 <T	.002 <T
SEP	.018	.008 <T	.058	.012	.004 <T	.010
OCT	.024	.002 <T	.006 <T	.050	.006 <T	.008 <T
NOV	.022	.012	.010	.010	!IS	.002 <T
DEC	.016	.008 <T	BDL	.004 <T	BDL	BDL
NITRITE (MG/L)		DET'N LIMIT = 0.001		GUIDELINE = 1.000 (A1)		
JAN	.008	.001 <T	.001 <T	.001 <T	.002 <T	.001 <T
FEB	.006	.004 <T	.003 <T	.003 <T	.002 <T	.002 <T
MAR	.006	.002 <T	.002 <T	.002 <T	.002 <T	.001 <T
APR	.004 <T	BDL	.001 <T	BDL	BDL	.001 <T
MAY	.012	.008	.002 <T	.002 <T	.002 <T	.002 <T
JUN	.005	.005	.004 <T	.004 <T	.004 <T	.004 <T
JUL	.002 <T	BDL	BDL	BDL	BDL	BDL
AUG	.001 <T	.001 <T	.002 <T	.002 <T	.002 <T	.003 <T
SEP	.004 <T	.003 <T	.004 <T	.004 <T	.003 <T	.003 <T
OCT	.004 <T	.001 <T	.002 <T	.001 <T	.001 <T	.001 <T
NOV	.018	.010	.015	.011	!IS	.008
DEC	.004 <T	BDL	.001 <T	.001 <T	.001 <T	.001 <T
TOTAL NITRATES (MG/L)		DET'N LIMIT = .020		GUIDELINE = 10.000 (A1)		
JAN	.205	.200	.200	.205	.210	.200
FEB	.235	.235	.360	.230	.230	.225
MAR	.265	.250	.480	.270	.245	.235
APR	.175	.175	.190	.170	.190	.190
MAY	.185	.180	.170	.170	.180	.170
JUN	.175	.120	.135	.125	.120	.120
JUL	.095 <T	.085 <T	.095 <T	.085 <T	.095 <T	.090 <T
AUG	.135	.100	.105	.100	.105	.125
SEP	.155	.150	.165	.155	.155	.150
OCT	.235	.230	.230	.285	.230	.215
NOV	.285	.285	.290	.270	!IS	.265
DEC	.270	.270	.280	.275	.280	.280
NITROGEN TOT KJELD (MG/L)		DET'N LIMIT = .020		GUIDELINE = N/A		
JAN	.330	.160	.220	.120	.120	.120
FEB	.260	.140	.230	.090 <T	.120	.110
MAR	.270	.120	.180	.080 <T	.100	.080 <T
APR	.300	.130	.220	.130	.120	.110
MAY	.240	.090 <T	.090 <T	.070 <T	.070 <T	.080 <T
JUN	.120	.120	.140	.220	.110	.190
JUL	.200	.120	.160	.110	.100	.090 <T

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM BRITANNIA WATER TREATMENT PLANT 1987

WATER TREATMENT PLANT			DISTRIBUTION SYSTEM			
SITE TYPE	TREATED	SITE 1		SITE 2		
		STANDING	FREE FLOW	STANDING	FREE FLOW	
AUG	.230	.150	.130	.150	.080 <T	.100
SEP	.260	.140	.280	.130	.130	.120
OCT	.350	.190	.160	.230	.210	.170
NOV	.310	.170	.160	.150	!IS	.160
DEC	.290	.130	.140	.120	.140	.150
PH (DMSNLESS)		DET'N LIMIT = N/A		GUIDELINE = 6.5-8.5(A4)		
JAN	7.580	8.610	7.870	8.000	8.190	8.320
FEB	7.450	8.120	7.770	7.780	7.840	7.900
MAR	7.760	8.440	7.870	8.050	8.000	8.110
APR	7.770	7.820	7.870	7.870	7.860	7.870
MAY	7.710	8.400	7.950	7.850	7.870	7.980
JUN	7.830	7.950	8.000	7.990	7.980	8.140
JUL	7.610	7.790	7.970	7.890	8.090	8.350
AUG	7.630	7.730	7.950	7.920	7.910	8.000
SEP	7.630	7.690	7.850	7.900	8.130	8.190
OCT	7.490	7.500	7.590	!IS	7.690	7.550
NOV	7.550	7.790	7.750	7.780	!IS	7.700
DEC	7.690	7.850	7.780	7.740	7.790	7.810
PHOSPHORUS FIL REACT (MG/L)		DET'N LIMIT = .5UG/L		GUIDELINE = N/A		
JAN	.003	.002 <T	.	.	.	.
FEB	.004	.006	.	.	.	.
MAR	.002	.006	.	.	.	.
APR	.002	.005	.	.	.	.
MAY	.003	.007	.	.	.	.
JUN	.002	.004	.	.	.	.
JUL	.003	.008	.	.	.	.
AUG	.004	.006	.	.	.	.
SEP	.011	.008	.	.	.	.
OCT	.002	.004	.	.	.	.
NOV	.003	.008	.	.	.	.
DEC	.004	.008	.	.	.	.
PHOSPHORUS TTL-UNFIL (MG/L)		DET'N LIMIT = .002		GUIDELINE = .40 (F2)		
JAN	.009 <T	.003 <T	.	.	.	.
FEB	.007 <T	.005 <T	.	.	.	.
MAR	.012	.015	.	.	.	.
APR	.015	.016	.	.	.	.
MAY	.009 <T	.008 <T	.	.	.	.
JUN	.006 <T	.004 <T	.	.	.	.
JUL	.011	.014	.	.	.	.
AUG	.013	.013	.	.	.	.
SEP	!CR	!CR	.	.	.	.

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM BRITANNIA WATER TREATMENT PLANT 1987

WATER TREATMENT PLANT			DISTRIBUTION SYSTEM			
SITE TYPE	TREATED		SITE 1		SITE 2	
			STANDING	FREE FLOW	STANDING	FREE FLOW
OCT	.015	.009 <T	.	.	.	.
NOV	.015	.020	.	.	.	.
DEC	.011	.013	.	.	.	.
RESIDUE (TOTAL) (MG/L)		DET'N LIMIT = 1.		GUIDELINE = 500. (A3)		
JAN	56 CRO	99 CRO	97 CRO	96 CRO	99 CRO	98 CRO
FEB	70	93 CRO	93 CRO	91 CRO	92 CRO	91 CRO
MAR	70	107 CRO	101	104 CRO	105 CRO	104 CRO
APR	71	89 CRO	93 CRO	93 CRO	93 CRO	93 CRO
MAY	53 CRO	95 CRO	91 CRO	93 CRO	93 CRO	95 CRO
JUN	59 CRO	93 CRO	96 CRO	95 CRO	94 CRO	95 CRO
JUL	50 CRO	85 CRO	88 CRO	87 CRO	91 CRO	90 CRO
AUG	46 CRO	78 CRO	81 CRO	80 CRO	81 CRO	82 CRO
SEP	48 CRO	78 CRO	83 CRO	82 CRO	82 CRO	83 CRO
OCT	52 CRO	82 CRO	87 CRO	!!S	89 CRO	87 CRO
NOV	72	86 CRO	89 CRO	88 CRO	!!S	88 CRO
DEC	63 CRO	104 CRO	102 CRO	99 CRO	103 CRO	101 CRO
TURBIDITY (FTU)		DET'N LIMIT = .02		GUIDELINE = 1.00 (A1)		
JAN	3.100	1.690	.420	.180	.360	.300
FEB	2.700	.800	.200	.400	.100	.700
MAR	2.600	.340	.240	.160	.280	.180
APR	2.700	.230	.370	.220	.310	.160
MAY	1.690	.330	.210	.130	.190	.220
JUN	.450	.240	.320	.180	.230	.210
JUL	1.470	.380	.270	.250	.360	.320
AUG	1.640	.290	.160	.230	.320	.310
SEP	2.200	3.100 RRV	.290	.220	.480	.210
OCT	4.500	.130	.130	!!S	.180	.150
NOV	4.900	.290	.190	.100 <T	!!S	.250
DEC	1.720	.290	.230	.150	.250	.140

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM BRITANNIA WATER TREATMENT PLANT 1987

WATER TREATMENT PLANT				DISTRIBUTION SYSTEM		
SITE		TREATED	SITE 1		SITE 2	
TYPE			STANDING	FREE FLOW	STANDING	FREE FLOW

METALS						
ALUMINUM (MG/L)			DET'N LIMIT = .004	GUIDELINE = .10	(A4)	
JAN	.210	.140	.120	.100	.120	.099
FEB	.200	.130	.110	.120	.120	.077
MAR	.260	.091	.130	.097	.120	.100
APR	.170	.057	.086	.067	.077	.059
MAY	.140	.100	.120	.092	.100	.100
JUN	.100	.058	.074	.054	.067	.068
JUL	.120	.095	.091	.077	.089	.100
AUG	.130	.081	!BT	.095	.093	.094
SEP	.190	.150	.110	.083	.130	.093
OCT	.240	.077	.110	.080	.100	.082
NOV	.320	.110	.110	.110	.094	.095
DEC	.110	.076	.067	.062	.079	.068

BARIUM (MG/L)			DET'N LIMIT = 0.001	GUIDELINE = 1.000	(A1)	
JAN	.017	.015	.017	.014	.016	.014
FEB	.016	.015	.018	.014	.017	.014
MAR	.018	.015	.018	.015	.016	.014
APR	.017	.018	.018	.015	.018	.015
MAY	.016	.014	.017	.015	.017	.015
JUN	.019	.018	.020	.018	.018	.018
JUL	.015	.015	.015	.015	.015	.015
AUG	.014	.013	!BT	.013	.013	.014
SEP	.014	.019	.013	.013	.013	.013
OCT	.015	.014	.016	.014	.015	.013
NOV	.017	.014	.015	.013	.014	.013
DEC	.016	.015	.017	.016	.018	.015

BORON (MG/L)			DET'N LIMIT = 0.01	GUIDELINE = 5.000	(A1)	
JAN	BDL	BDL	BDL	BDL	BDL	BDL
FEB	BDL	BDL	BDL	BDL	BDL	BDL
MAR	BDL	BDL	BDL	BDL	BDL	BDL
APR	BDL	.010	BDL	.000	.010	.010
MAY	BDL	BDL	.020 <T	.010 <T	BDL	BDL
JUN	BDL	BDL	BDL	BDL	BDL	BDL
JUL	BDL	.010 <T	BDL	BDL	BDL	BDL
AUG	BDL	BDL	BDL	.010 <T	BDL	BDL
SEP	BDL	BDL	BDL	BDL	BDL	BDL
OCT	BDL	BDL	BDL	BDL	BDL	BDL
NOV	.014 <T	.013 <T	.012 <T	.014 <T	.014 <T	.013 <T
DEC	.006 <T	.014 <T	.013 <T	BDL	BDL	.007 <T

BERYLLIUM (MG/L)			DET'N LIMIT = 0.001	GUIDELINE = .0002	(H)	
JAN	BDL	BDL	BDL	BDL	BDL	BDL

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM BRITANNIA WATER TREATMENT PLANT 1987

WATER TREATMENT PLANT			DISTRIBUTION SYSTEM			
SITE TYPE	TREATED	SITE 1		SITE 2		
		STANDING	FREE FLOW	STANDING	FREE FLOW	
FEB	BDL	BDL	BDL	BDL	BDL	BDL
MAR	BDL	BDL	BDL	BDL	BDL	BDL
APR	BDL	BDL	BDL	BDL	BDL	BDL
MAY	BDL	BDL	BDL	BDL	BDL	BDL
JUN	BDL	BDL	BDL	BDL	BDL	BDL
JUL	BDL	BDL	.001	BDL	BDL	BDL
AUG	BDL	BDL	!BT	BDL	BDL	BDL
SEP	BDL	BDL	BDL	BDL	BDL	BDL
OCT	BDL	BDL	BDL	BDL	BDL	BDL
NOV	BDL	BDL	BDL	BDL	BDL	BDL
DEC	BDL	BDL	BDL	BDL	BDL	BDL
CADMIUM (UG/L)		DET'N LIMIT = 0.300		GUIDELINE = 5.000 (A1)		
JAN	BDL	BDL	BDL	BDL	BDL	BDL
FEB	BDL	BDL	BDL	BDL	BDL	BDL
MAR	BDL	BDL	BDL	BDL	BDL	BDL
APR	BDL	BDL	BDL	BDL	BDL	BDL
MAY	BDL	BDL	BDL	BDL	BDL	BDL
JUN	BDL	BDL	BDL	BDL	BDL	BDL
JUL	BDL	BDL	BDL	BDL	BDL	BDL
AUG	BDL	BDL	!BT	BDL	BDL	BDL
SEP	BDL	BDL	BDL	BDL	BDL	BDL
OCT	BDL	BDL	BDL	BDL	BDL	BDL
NOV	BDL	BDL	BDL	.400	BDL	BDL
DEC	BDL	BDL	BDL	BDL	BDL	BDL
COBALT (MG/L)		DET'N LIMIT = 0.001		GUIDELINE = 1.0 (H)		
JAN	BDL	BDL	BDL	BDL	BDL	BDL
FEB	BDL	BDL	BDL	BDL	BDL	BDL
MAR	BDL	BDL	BDL	BDL	BDL	BDL
APR	BDL	BDL	BDL	BDL	.002	BDL
MAY	BDL	BDL	BDL	BDL	BDL	BDL
JUN	.001	.001	BDL	BDL	BDL	BDL
JUL	BDL	BDL	BDL	BDL	BDL	BDL
AUG	BDL	BDL	!BT	BDL	BDL	BDL
SEP	BDL	BDL	BDL	BDL	BDL	BDL
OCT	BDL	BDL	BDL	BDL	BDL	BDL
NOV	BDL	BDL	BDL	BDL	BDL	BDL
DEC	BDL	BDL	BDL	BDL	BDL	BDL
CHROMIUM (MG/L)		DET'N LIMIT = 0.001		GUIDELINE = .05 (A1)		
JAN	.001	BDL	BDL	BDL	BDL	BDL
FEB	.001	.001	.001	BDL	BDL	BDL
MAR	.001	.001	BDL	BDL	BDL	BDL

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM BRITANNIA WATER TREATMENT PLANT 1987

WATER TREATMENT PLANT			DISTRIBUTION SYSTEM			
SITE						
TYPE		TREATED	SITE 1	SITE 2		
			STANDING	FREE FLOW	STANDING	FREE FLOW
APR	BDL	.001	BDL	BDL	BDL	BDL
MAY	BDL	.001	BDL	BDL	BDL	BDL
JUN	.001	.001	BDL	BDL	BDL	BDL
JUL	BDL	BDL	BDL	BDL	BDL	BDL
AUG	.001	BDL	!BT	BDL	BDL	BDL
SEP	.001	.003	BDL	.004	BDL	BDL
OCT	.001	BDL	.001	BDL	BDL	BDL
NOV	.001	.001	.001	.001	.001	.001
DEC	BDL	.001	.001	.001	BDL	BDL
COPPER (MG/L)		DET'N LIMIT = .001		GUIDELINE = 1.0 (A3)		
JAN	.008	BDL	.016	.003	.027	.001
FEB	.008	BDL	.028	.002	.028	.001
MAR	.022	.001	.018	.002	.032	.002
APR	.013	.001	.029	.013	.048	.003
MAY	.011	.001	.019	.004	.032	.002
JUN	.037	.004	.026	.005	.053	.007
JUL	.020	.002	.022	.004	.036	.009
AUG	.013	.001	!BT	.004	.048	.008
SEP	.012	.034	.024	.004	.032	.005
OCT	.011	.001	.023	.004	.042	.004
NOV	.009	.001	.028	.005	.049	.003
DEC	.009	BDL	.032	.005	.048	.003
IRON (MG/L)		DET'N LIMIT = .002		GUIDELINE = .300 (A3)		
JAN	.200	.012	.019	.010	.014	.012
FEB	.200	.029	.021	.021	.013	.014
MAR	.240	.094	.020	.014	.018	.016
APR	.200	.058	.018	.015	.021	.012
MAY	.180	.020	BDL	BDL	BDL	BDL
JUN	.180	.031	.023	.015	.035	.014
JUL	.160	.110	.120	.038	.031	.062
AUG	.170	.018	!BT	.016	.013	.010
SEP	.170	.800	.094	.096	.100	.140
OCT	.250	.020	.063	.056	.015	.068
NOV	.330	.031	.010	.025	.015	.014
DEC	.170	.033	.022	.014	.013	.013
MERCURY (UG/L)		DET'N LIMIT = 0.010		GUIDELINE = 1.000 (A1)		
JAN	.010	.010	.	BDL	.	BDL
FEB	.010	.010	.	BDL	.	.010
MAR	.020	.020	.	BDL	.	.020
APR	.020	.020	.	BDL	.	.020
MAY	.020	.020	.	BDL	.	.020

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM BRITANNIA WATER TREATMENT PLANT 1987

WATER TREATMENT PLANT				DISTRIBUTION SYSTEM		
SITE TYPE		TREATED	SITE 1		SITE 2	
			STANDING	FREE FLOW	STANDING	FREE FLOW
JUN	.030	.030	.	.010	.	.040
JUL	.040	.040	.	.010	.	.050
AUG	.050	.040	.	.010	.	.060
SEP	.040	.050	.	.010	.	.080
OCT	.050	.010	.	.010	.	.080
NOV	.030	.030	.	.010	.	.090
DEC	.010	.010	.	.010	.	.080
MANGANESE (MG/L)		DET'N LIMIT = .001		GUIDELINE = .050 (A3)		
JAN	.009	.007	.005	.004	.005	.005
FEB	.010	.012	.007	.008	.006	.008
MAR	.011	.014	.008	.010	.009	.009
APR	.012	.023	.007	.008	.008	.007
MAY	.011	.016	.005	.006	.006	.006
JUN	.009	.011	.006	.005	.009	.007
JUL	.014	.009	.006	.006	.011	.014
AUG	.015	.006	!BT	.005	.007	.005
SEP	.015	.210	.006	.009	.012	.008
OCT	.024	.007	.005	.006	.007	.006
NOV	.017	.011	.006	.008	.007	.006
DEC	.012	.011	.006	.006	.007	.008
MOLYBDENUM (MG/L)		DET'N LIMIT = 0.001		GUIDELINE = .50 (H)		
JAN	BDL	BDL	BDL	BDL	BDL	BDL
FEB	BDL	BDL	BDL	BDL	BDL	BDL
MAR	BDL	BDL	BDL	BDL	BDL	BDL
APR	BDL	BDL	BDL	BDL	BDL	BDL
MAY	BDL	BDL	BDL	BDL	BDL	BDL
JUN	BDL	BDL	BDL	BDL	BDL	BDL
JUL	BDL	BDL	.002	BDL	.001	BDL
AUG	BDL	BDL	!BT	BDL	BDL	BDL
SEP	BDL	BDL	BDL	BDL	BDL	BDL
OCT	BDL	BDL	BDL	BDL	BDL	BDL
NOV	BDL	BDL	BDL	.001	BDL	BDL
DEC	BDL	BDL	BDL	BDL	BDL	BDL
NICKEL (MG/L)		DET'N LIMIT = 0.001		GUIDELINE = .05 (F3)		
JAN	BDL	BDL	BDL	BDL	.002	BDL
FEB	BDL	BDL	BDL	BDL	BDL	BDL
MAR	BDL	BDL	BDL	BDL	BDL	BDL
APR	BDL	BDL	BDL	BDL	BDL	BDL
MAY	BDL	BDL	BDL	BDL	.002	BDL
JUN	BDL	.012	BDL	BDL	.003	BDL
JUL	.002	.002	.002	BDL	.004	.002

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM BRITANNIA WATER TREATMENT PLANT 1987

WATER TREATMENT PLANT			DISTRIBUTION SYSTEM			
SITE TYPE	TREATED	SITE 1		SITE 2		
		STANDING	FREE FLOW	STANDING	FREE FLOW	
AUG	BDL	BDL	!BT	BDL	BDL	BDL
SEP	BDL	.003	BDL	BDL	BDL	BDL
OCT	.005	.001	.001	BDL	.002	.008
NOV	.001	.001	.001	.001	.004	.002
DEC	.002	.002	.001	.002	.004	.001

LEAD (MG/L) DET'N LIMIT = 0.003 GUIDELINE = .050 (A1)						
JAN	BDL	BDL	BDL	BDL	.010	BDL
FEB	BDL	BDL	BDL	BDL	.006	BDL
MAR	.005	BDL	.003	BDL	.009	BDL
APR	BDL	BDL	.003	BDL	.021	BDL
MAY	BDL	BDL	BDL	BDL	.007	BDL
JUN	.012	.008	.004	.004	.013	.004
JUL	BDL	BDL	BDL	BDL	.008	BDL
AUG	BDL	BDL	!BT	BDL	.007	BDL
SEP	BDL	BDL	BDL	BDL	.008	BDL
OCT	BDL	BDL	.003	BDL	.008	BDL
NOV	BDL	BDL	BDL	BDL	.014	BDL
DEC	BDL	BDL	BDL	.003	.012	BDL

STRONTIUM (MG/L) DET'N LIMIT = .001 GUIDELINE = 2.00 (H)						
JAN	.046	.048	.048	.043	.051	.048
FEB	.044	.063	.063	.057	.062	.058
MAR	.048	.067	.069	.065	.063	.059
APR	.046	.063	.064	.060	.064	.062
MAY	.047	.063	.064	.062	.065	.064
JUN	.053	.068	.072	.068	.070	.071
JUL	.045	.058	.059	.059	.060	.064
AUG	.039	.047	!BT	.053	.053	.056
SEP	.039	.053	.053	.053	.057	.056
OCT	.040	.051	.055	.054	.060	.053
NOV	.043	.053	.056	.054	.054	.054
DEC	.051	.066	.067	.063	.074	.070

URANIUM (UG/L) DET'N LIMIT = .02 GUIDELINE = 20. (A2)						
JAN	BDL	BDL	BDL	BDL	BDL	BDL
FEB	.100	BDL	BDL	BDL	BDL	BDL
MAR	BDL	BDL	BDL	BDL	BDL	BDL
APR	.080	.010	.030	.020	.030	.020
MAY	.080	.010	BDL	BDL	.020	BDL
JUN	BDL	BDL	BDL	BDL	BDL	BDL
JUL	.060	.040	.040	.050	.060	.060
AUG	.030	BDL	!IS	BDL	BDL	BDL
SEP	.050	.020	.010	.010	.010	.020

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM BRITANNIA WATER TREATMENT PLANT 1987

WATER TREATMENT PLANT			DISTRIBUTION SYSTEM			
SITE TYPE	TREATED	SITE 1		SITE 2		
		STANDING	FREE FLOW	STANDING	FREE FLOW	
OCT	.440	.100	BDL	BDL	BDL	BDL
NOV	.100	BDL	BDL	BDL	BDL	BDL
DEC	BDL	BDL	BDL	BDL	BDL	BDL
VANADIUM (MG/L)		DET'N LIMIT = .001		GUIDELINE = .10 (H)		
JAN	BDL	.001	.001	.001	.001	.001
FEB	BDL	.001	BDL	.001	BDL	.001
MAR	BDL	.001	.001	BDL	BDL	.001
APR	.001	.001	.001	.001	.001	.001
MAY	BDL	.001	.001	.001	.001	.001
JUN	.001	.001	BDL	.001	.001	.001
JUL	.001	.001	.001	.001	.001	.001
AUG	.001	.001	!BT	.001	.001	.001
SEP	BDL	.001	.001	BDL	BDL	BDL
OCT	.001	BDL	.001	BDL	BDL	BDL
NOV	.002	BDL	.001	.001	.001	BDL
DEC	BDL	.002	.002	.001	BDL	BDL
ZINC (MG/L)		DET'N LIMIT = .001		GUIDELINE = 5.00 (A3)		
JAN	.008	.004	.009	.002	.012	.003
FEB	.003	.003	.006	.002	.013	.002
MAR	.013	.007	.010	.011	.025	.009
APR	.003	.011	.008	.002	.018	.001
MAY	.004	.005	.004	.004	.015	.004
JUN	.005	.005	.007	.001	.014	.002
JUL	.003	.002	.006	.002	.012	.003
AUG	.015	.001	!BT	.008	.013	.004
SEP	BDL	.011	.006	.004	.009	BDL
OCT	.005	BDL	.006	.002	.015	.002
NOV	.002	BDL	.005	BDL	.016	BDL
DEC	.002	.004	.006	.002	.019	.002

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM BRITANNIA WATER TREATMENT PLANT 1987

WATER TREATMENT PLANT				DISTRIBUTION SYSTEM		
SITE		TREATED	SITE 1		SITE 2	
TYPE			STANDING	FREE FLOW	STANDING	FREE FLOW

CHLOROAROMATICS						
HEXACHLOROBUTADIENE (NG/L)			DET'N LIMIT = 1.000		GUIDELINE = 450. (D4)	
JAN	BDL	BDL	.	BDL	.	BDL
FEB	BDL	BDL	.	BDL	.	BDL
MAR	BDL	BDL	.	BDL	.	BDL
APR	BDL	BDL	.	BDL	.	2.000 <T
MAY	BDL	BDL	.	BDL	.	BDL
JUN	BDL	BDL	.	BDL	.	BDL
JUL	BDL	BDL	.	BDL	.	BDL
AUG	BDL	BDL	.	BDL	.	BDL
SEP	BDL	BDL	.	BDL	.	BDL
OCT	BDL	BDL	.	BDL	.	BDL
NOV	BDL	BDL	.	!BT	.	BDL
DEC	BDL	BDL	.	BDL	.	BDL

1235 T-CHLOROBENZENE (NG/L)			DET'N LIMIT = 1.000		GUIDELINE = 10000. (I)	
JAN	BDL	BDL	.	BDL	.	BDL
FEB	BDL	BDL	.	BDL	.	BDL
MAR	BDL	BDL	.	BDL	.	BDL
APR	BDL	BDL	.	8.000 <T	.	BDL
MAY	BDL	BDL	.	BDL	.	BDL
JUN	BDL	BDL	.	BDL	.	BDL
JUL	BDL	BDL	.	BDL	.	BDL
AUG	BDL	BDL	.	BDL	.	BDL
SEP	BDL	BDL	.	BDL	.	BDL
OCT	BDL	BDL	.	BDL	.	BDL
NOV	BDL	BDL	.	!BT	.	BDL
DEC	BDL	BDL	.	BDL	.	BDL

124 TRICHLOROBENZENE (NG/L)			DET'N LIMIT = 5.000		GUIDELINE = 10000. (I)	
JAN	BDL	BDL	.	BDL	.	BDL
FEB	BDL	BDL	.	BDL	.	BDL
MAR	BDL	BDL	.	BDL	.	BDL
APR	BDL	BDL	.	BDL	.	8.000 <T
MAY	BDL	BDL	.	BDL	.	BDL
JUN	BDL	BDL	.	BDL	.	BDL
JUL	BDL	BDL	.	BDL	.	BDL
AUG	BDL	BDL	.	BDL	.	BDL
SEP	BDL	BDL	.	BDL	.	BDL
OCT	BDL	BDL	.	BDL	.	BDL
NOV	BDL	BDL	.	!BT	.	BDL
DEC	BDL	BDL	.	BDL	.	BDL

1245 T-CHLOROBENZENE (NG/L)			DET'N LIMIT = 1.000		GUIDELINE = 38000. (D4)	
JAN	BDL	BDL	.	BDL	.	BDL

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM BRITANNIA WATER TREATMENT PLANT 1987

WATER TREATMENT PLANT			DISTRIBUTION SYSTEM			
SITE TYPE	TREATED	SITE 1		SITE 2		
		STANDING	FREE FLOW	STANDING	FREE FLOW	
FEB	BDL	BDL	.	BDL	.	BDL
MAR	BDL	BDL	.	BDL	.	BDL
APR	BDL	4.000 <T	.	1.000 <T	.	BDL
MAY	BDL	BDL	.	BDL	.	BDL
JUN	BDL	BDL	.	BDL	.	BDL
JUL	BDL	BDL	.	BDL	.	BDL
AUG	BDL	BDL	.	BDL	.	BDL
SEP	BDL	BDL	.	BDL	.	BDL
OCT	BDL	BDL	.	BDL	.	BDL
NOV	BDL	BDL	.	!BT	.	2.000 <T
DEC	BDL	BDL	.	BDL	.	BDL

135 TRICHLOROBENZENE (NG/L)		DET'N LIMIT = 5.000		GUIDELINE = 10000. (D4)		
JAN	BDL	BDL	.	BDL	.	BDL
FEB	BDL	BDL	.	BDL	.	BDL
MAR	BDL	BDL	.	BDL	.	BDL
APR	BDL	BDL	.	BDL	.	BDL
MAY	BDL	BDL	.	BDL	.	BDL
JUN	BDL	BDL	.	BDL	.	BDL
JUL	BDL	5.000 <T	.	BDL	.	BDL
AUG	BDL	BDL	.	BDL	.	10.000 <T
SEP	BDL	BDL	.	BDL	.	BDL
OCT	BDL	BDL	.	BDL	.	BDL
NOV	BDL	BDL	.	!BT	.	BDL
DEC	BDL	BDL	.	BDL	.	BDL

HEXACHLOROETHANE (NG/L)		DET'N LIMIT = 1.000		GUIDELINE = 1900. (D4)		
JAN	BDL	6.000 <T	.	7.000 <T	.	7.000 <T
FEB	BDL	BDL	.	BDL	.	BDL
MAR	BDL	8.000 <T	.	7.000 <T	.	5.000 <T
APR	BDL	2.000 <T	.	4.000 <T	.	2.000 <T
MAY	BDL	BDL	.	BDL	.	9.000 <T
JUN	BDL	BDL	.	BDL	.	BDL
JUL	BDL	1.000 <T	.	7.000 <T	.	BDL
AUG	BDL	5.000 <T	.	BDL	.	BDL
SEP	BDL	BDL	.	BDL	.	BDL
OCT	BDL	BDL	.	BDL	.	BDL
NOV	BDL	BDL	.	!BT	.	BDL
DEC	BDL	BDL	.	BDL	.	BDL

236 TRICHLOROTOLUENE (NG/L)		DET'N LIMIT = 5.000		GUIDELINE = N/A		
JAN	BDL	BDL	.	BDL	.	BDL
FEB	BDL	BDL	.	BDL	.	BDL
MAR	BDL	7.000 <T	.	BDL	.	BDL

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM BRITANNIA WATER TREATMENT PLANT 1987

SITE TYPE	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM			
	TREATED		SITE 1		SITE 2	
			STANDING	FREE FLOW	STANDING	FREE FLOW
APR	BDL	BDL	.	BDL	.	BDL
MAY	BDL	BDL	.	BDL	.	BDL
JUN	BDL	BDL	.	BDL	.	BDL
JUL	BDL	BDL	.	BDL	.	BDL
AUG	BDL	BDL	.	BDL	.	BDL
SEP	BDL	BDL	.	BDL	.	BDL
OCT	BDL	BDL	.	BDL	.	BDL
NOV	BDL	BDL	.	!BT	.	BDL
DEC	BDL	BDL	.	BDL	.	BDL

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM BRITANNIA WATER TREATMENT PLANT 1987

WATER TREATMENT PLANT			DISTRIBUTION SYSTEM			
SITE		TREATED	SITE 1		SITE 2	
TYPE			STANDING	FREE FLOW	STANDING	FREE FLOW

CHLOROPHENOLS						
246-TRICHLOROPHENOL (NG/L)		DET'N LIMIT = 50.		GUIDELINE = 10000. (C1)		
JUN	BDL	50.000 <T	.	.	.	.
NOV	BDL	.	.	.	.	.

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM BRITANNIA WATER TREATMENT PLANT 1987

WATER TREATMENT PLANT				DISTRIBUTION SYSTEM			
SITE		TREATED		SITE 1		SITE 2	
TYPE				STANDING	FREE FLOW	STANDING	FREE FLOW

PESTICIDES & PCB							
ALPHA BHC (NG/L)		DET'N LIMIT = 1.000		GUIDELINE = 700.		(G)	
JAN	BDL	1.000 <T	.	1.000 <T	.	2.000 <T	
FEB	BDL	BDL	.	BDL	.	BDL	
MAR	4.000 <T	3.000 <T	.	4.000 <T	.	6.000 <T	
APR	2.000 <T	2.000 <T	.	1.000 <T	.	1.000 <T	
MAY	2.000 <T	BDL	.	BDL	.	BDL	
JUN	BDL	BDL	.	BDL	.	BDL	
JUL	BDL	2.000 <T	.	1.000 <T	.	BDL	
AUG	1.000 <T	BDL	.	BDL	.	BDL	
SEP	BDL	3.000 <T	.	BDL	.	BDL	
OCT	BDL	1.000 <T	.	BDL	.	BDL	
NOV	1.000 <T	2.000 <T	.	!BT	.	1.000 <T	
DEC	1.000 <T	2.000 <T	.	2.000 <T	.	1.000 <T	

LINDANE (NG/L)		DET'N LIMIT = 1.000		GUIDELINE = 4000.0 (A1)			
JAN	BDL	BDL	.	BDL	.	1.000 <T	
FEB	BDL	BDL	.	BDL	.	BDL	
MAR	1.000 <T	BDL	.	BDL	.	1.000 <T	
APR	BDL	BDL	.	BDL	.	BDL	
MAY	BDL	BDL	.	BDL	.	BDL	
JUN	BDL	BDL	.	BDL	.	BDL	
JUL	BDL	BDL	.	BDL	.	BDL	
AUG	BDL	BDL	.	BDL	.	BDL	
SEP	BDL	3.000 <T	.	BDL	.	BDL	
OCT	BDL	BDL	.	BDL	.	BDL	
NOV	BDL	BDL	.	!BT	.	BDL	
DEC	BDL	BDL	.	BDL	.	BDL	

PPDE (NG/L)		DET'N LIMIT = 1.000		GUIDELINE = 30000. (A1)			
JAN	BDL	BDL	.	BDL	.	BDL	
FEB	BDL	BDL	.	BDL	.	BDL	
MAR	BDL	BDL	.	BDL	.	2.000 <T	
APR	BDL	BDL	.	BDL	.	BDL	
MAY	BDL	BDL	.	BDL	.	BDL	
JUN	BDL	BDL	.	BDL	.	BDL	
JUL	BDL	BDL	.	BDL	.	BDL	
AUG	BDL	BDL	.	BDL	.	BDL	
SEP	BDL	BDL	.	BDL	.	BDL	
OCT	BDL	BDL	.	BDL	.	BDL	
NOV	BDL	BDL	.	!BT	.	BDL	
DEC	BDL	BDL	.	BDL	.	BDL	

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM BRITANNIA WATER TREATMENT PLANT 1987

WATER TREATMENT PLANT			DISTRIBUTION SYSTEM			
SITE						
TYPE	TREATED		SITE 1		SITE 2	
			STANDING	FREE FLOW	STANDING	FREE FLOW
PHENOLICS						
PHENOL (UG/L)		DET'N LIMIT = 0.2			GUIDELINE = 2.00 (A3)	
JAN	.400 <T	.200 <T	.	.	.	.
FEB	.800 <T	.400 <T	.	.	.	.
MAR	.600 <T	.400 <T	.	.	.	.
MAY	1.200	1.000	.	.	.	.
JUN	1.200	1.200	.	.	.	.
JUL	BDL	.400 <T	.	.	.	.
AUG	.400 <T	.400 <T	.	.	.	.
SEP	.400 <T	.600 <T	.	.	.	.
OCT	.200 <T	.200 <T	.	.	.	.
NOV	.200 <T	.200 <T	.	.	.	.
DEC	BDL	.200 <T	.	.	.	.

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM BRITANNIA WATER TREATMENT PLANT 1987

WATER TREATMENT PLANT				DISTRIBUTION SYSTEM			
SITE		TREATED	SITE 1		SITE 2		
TYPE			STANDING	FREE FLOW	STANDING	FREE FLOW	

VOLATILES							
BENZENE (UG/L)			DET'N LIMIT = 0		GUIDELINE = 5.0	(D1)	
JAN	BDL	BDL	.	BDL	.		BDL
FEB	BDL	BDL	.	BDL	.		BDL
MAR	BDL	BDL	.	BDL	.		BDL
APR	BDL	BDL	.	BDL	.		BDL
MAY	BDL	BDL	.	BDL	.		BDL
JUN	BDL	BDL	.	BDL	.		BDL
JUL	BDL	BDL	.	BDL	.		BDL
AUG	BDL	BDL	.	BDL	.		BDL
SEP	BDL	BDL	.	BDL	.		BDL
OCT	BDL	BDL	.	BDL	.		BDL
NOV	BDL	BDL	.	.050 <T	.		BDL
DEC	BDL	BDL	.	BDL	.		BDL

TOLUENE (UG/L)			DET'N LIMIT = 0		GUIDELINE = 100.0	(G)	
JAN	BDL	BDL	.	BDL	.		BDL
FEB	BDL	BDL	.	BDL	.		BDL
MAR	BDL	BDL	.	BDL	.		BDL
APR	BDL	BDL	.	BDL	.		BDL
MAY	BDL	BDL	.	BDL	.		BDL
JUN	BDL	BDL	.	BDL	.		BDL
JUL	BDL	BDL	.	BDL	.		BDL
AUG	BDL	BDL	.	BDL	.		BDL
SEP	BDL	BDL	.	BDL	.		BDL
OCT	BDL	.050 <T	.	.100 <T	.		BDL
NOV	BDL	BDL	.	.050 <T	.		BDL
DEC	BDL	BDL	.	BDL	.		BDL

ETHYLBENZENE (UG/L)			DET'N LIMIT = 0		GUIDELINE = 3400.	(D3)	
JAN	BDL	BDL	.	BDL	.		BDL
FEB	BDL	BDL	.	BDL	.		BDL
MAR	BDL	BDL	.	BDL	.		BDL
APR	BDL	BDL	.	BDL	.		BDL
MAY	BDL	BDL	.	BDL	.		BDL
JUN	BDL	.200 <T	.	.150 <T	.		.200 <T
JUL	BDL	.250 <T	.	.150 <T	.		BDL
AUG	BDL	BDL	.	BDL	.		BDL
SEP	BDL	BDL	.	BDL	.		BDL
OCT	BDL	.100 <T	.	.100 <T	.		BDL
NOV	BDL	BDL	.	BDL	.		BDL
DEC	BDL	BDL	.	BDL	.		BDL

P-XYLENE (UG/L)			DET'N LIMIT = 0		GUIDELINE = 620.	(G)	
JAN	BDL	BDL	.	BDL	.		BDL

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM BRITANNIA WATER TREATMENT PLANT 1987

WATER TREATMENT PLANT			DISTRIBUTION SYSTEM			
SITE TYPE	TREATED	SITE 1		SITE 2		
		STANDING	FREE FLOW	STANDING	FREE FLOW	
FEB	BDL	BDL	.	BDL	.	BDL
MAR	BDL	BDL	.	BDL	.	BDL
APR	BDL	BDL	.	BDL	.	BDL
MAY	BDL	BDL	.	BDL	.	BDL
JUN	BDL	BDL	.	BDL	.	.000 RMP
JUL	BDL	BDL	.	BDL	.	BDL
AUG	BDL	BDL	.	BDL	.	BDL
SEP	BDL	BDL	.	BDL	.	BDL
OCT	BDL	BDL	.	BDL	.	BDL
NOV	BDL	BDL	.	BDL	.	BDL
DEC	BDL	BDL	.	BDL	.	BDL
M-XYLENE (UG/L)		DET'N LIMIT = 0		GUIDELINE = 620. (G)		
JAN	BDL	BDL	.	BDL	.	BDL
FEB	BDL	BDL	.	BDL	.	BDL
MAR	BDL	BDL	.	BDL	.	BDL
APR	BDL	BDL	.	BDL	.	BDL
MAY	BDL	BDL	.	BDL	.	BDL
JUN	BDL	BDL	.	BDL	.	.200 <T
JUL	BDL	BDL	.	BDL	.	BDL
AUG	BDL	BDL	.	BDL	.	BDL
SEP	BDL	BDL	.	BDL	.	BDL
OCT	BDL	BDL	.	BDL	.	BDL
NOV	BDL	BDL	.	BDL	.	BDL
DEC	BDL	BDL	.	BDL	.	BDL
O-XYLENE (UG/L)		DET'N LIMIT = 0		GUIDELINE = 620. (G)		
JAN	BDL	BDL	.	BDL	.	BDL
FEB	BDL	BDL	.	BDL	.	BDL
MAR	BDL	BDL	.	BDL	.	BDL
APR	BDL	BDL	.	BDL	.	BDL
MAY	BDL	BDL	.	BDL	.	BDL
JUN	BDL	BDL	.	BDL	.	.100 <T
JUL	BDL	BDL	.	BDL	.	BDL
AUG	BDL	BDL	.	BDL	.	BDL
SEP	BDL	BDL	.	BDL	.	BDL
OCT	BDL	BDL	.	BDL	.	BDL
NOV	BDL	BDL	.	BDL	.	BDL
DEC	BDL	BDL	.	BDL	.	BDL
1,1 DICHLOROETHYLENE (UG/L)		DET'N LIMIT = 0		GUIDELINE = 7.0 (D1)		
JAN	BDL	BDL	.	BDL	.	BDL
FEB	BDL	BDL	.	BDL	.	BDL
MAR	BDL	BDL	.	BDL	.	BDL

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM BRITANNIA WATER TREATMENT PLANT 1987

WATER TREATMENT PLANT			DISTRIBUTION SYSTEM			
SITE TYPE	TREATED	SITE 1		SITE 2		
		STANDING	FREE FLOW	STANDING	FREE FLOW	
APR	BDL	BDL	.	BDL	.	BDL
MAY	BDL	BDL	.	BDL	.	BDL
JUN	BDL	BDL	.	BDL	.	BDL
JUL	BDL	BDL	.	BDL	.	BDL
AUG	BDL	BDL	.	BDL	.	BDL
SEP	BDL	BDL	.	BDL	.	BDL
OCT	BDL	BDL	.	.000 SPS	.	.000 SPS
NOV	BDL	BDL	.	BDL	.	BDL
DEC	BDL	BDL	.	BDL	.	BDL
CHLOROFORM (UG/L)		DET'N LIMIT = 0		GUIDELINE = 350.0 (A1+)		
JAN	BDL	89.000	.	75.000	.	83.000
FEB	BDL	54.000	.	50.000	.	58.000
MAR	BDL	70.000	.	62.000	.	62.000
APR	.200 <T	70.000	.	75.000	.	75.000
MAY	BDL	110.000	.	90.400	.	100.000
JUN	BDL	132.000	.	115.000	.	136.000
JUL	.800 <T	170.000	.	155.000	.	170.000
AUG	BDL	150.000	.	150.000	.	150.000
SEP	BDL	170.000	.	160.000	.	170.000
OCT	.900 <T	161.000	.	137.000	.	152.000
NOV	.200 <T	173.000	.	164.000	.	140.000
DEC	.300 UCS	129.000	.	103.400	.	117.700
CARBON TETRACHLORIDE (UG/L)		DET'N LIMIT = 0		GUIDELINE = 5.0 (D1)		
JAN	BDL	BDL	.	BDL	.	BDL
FEB	BDL	BDL	.	BDL	.	BDL
MAR	BDL	BDL	.	BDL	.	BDL
APR	BDL	BDL	.	BDL	.	BDL
MAY	BDL	BDL	.	BDL	.	BDL
JUN	BDL	BDL	.	BDL	.	BDL
JUL	BDL	BDL	.	BDL	.	BDL
AUG	BDL	BDL	.	BDL	.	BDL
SEP	BDL	BDL	.	BDL	.	BDL
OCT	.200 UCR	BDL	.	BDL	.	BDL
NOV	BDL	BDL	.	BDL	.	BDL
DEC	BDL	BDL	.	BDL	.	BDL
DICHLOROBROMOMETHANE (UG/L)		DET'N LIMIT = 0		GUIDELINE = 350.0 (A1+)		
JAN	BDL	2.000	.	2.000	.	2.000
FEB	BDL	1.000	.	1.000	.	1.000
MAR	BDL	1.000	.	1.000	.	1.000
APR	BDL	2.000	.	1.000	.	2.000
MAY	BDL	1.700	.	1.850	.	1.750

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM BRITANNIA WATER TREATMENT PLANT 1987

WATER TREATMENT PLANT			DISTRIBUTION SYSTEM			
SITE TYPE	TREATED	SITE 1		SITE 2		
		STANDING	FREE FLOW	STANDING	FREE FLOW	
JUN	BDL	3.200	.	2.800	.	2.600
JUL	BDL	3.900	.	3.600	.	3.400
AUG	BDL	3.600	.	3.100	.	3.200
SEP	BDL	3.700	.	3.100	.	3.100
OCT	BDL	3.300	.	2.700	.	2.900
NOV	BDL	2.500	.	2.400	.	2.400
DEC	BDL	2.400	.	2.400	.	2.600
CHLORODIBROMOMETHANE (UG/L)		DET'N LIMIT = 0		GUIDELINE = 350.0 (A1+)		
JAN	BDL	BDL	.	BDL	.	BDL
FEB	BDL	BDL	.	BDL	.	1.000
MAR	BDL	BDL	.	BDL	.	BDL
APR	BDL	2.000	.	BDL	.	BDL
MAY	BDL	BDL	.	BDL	.	BDL
JUN	BDL	BDL	.	BDL	.	BDL
JUL	BDL	BDL	.	BDL	.	BDL
AUG	BDL	BDL	.	BDL	.	BDL
SEP	BDL	BDL	.	BDL	.	BDL
OCT	BDL	BDL	.	BDL	.	BDL
NOV	BDL	BDL	.	BDL	.	BDL
DEC	BDL	BDL	.	BDL	.	BDL
T-CHLOROETHYLENE (UG/L)		DET'N LIMIT = 0		GUIDELINE = 10.0 (C2)		
JAN	BDL	BDL	.	BDL	.	BDL
FEB	BDL	BDL	.	BDL	.	BDL
MAR	BDL	BDL	.	BDL	.	BDL
APR	BDL	BDL	.	BDL	.	BDL
MAY	BDL	BDL	.	BDL	.	BDL
JUN	BDL	BDL	.	BDL	.	BDL
JUL	BDL	BDL	.	BDL	.	BDL
AUG	BDL	BDL	.	BDL	.	BDL
SEP	BDL	BDL	.	BDL	.	BDL
OCT	BDL	BDL	.	BDL	.	BDL
NOV	BDL	BDL	.	.500 <T	.	BDL
DEC	BDL	.050 <T	.	BDL	.	BDL
1,4 DICHLOROBENZENE (UG/L)		DET'N LIMIT = 0		GUIDELINE = 75.0 (D1)		
JAN	BDL	BDL	.	BDL	.	BDL
FEB	BDL	BDL	.	BDL	.	BDL
MAR	BDL	BDL	.	BDL	.	BDL
APR	BDL	BDL	.	BDL	.	BDL
MAY	BDL	BDL	.	BDL	.	BDL
JUN	BDL	BDL	.	BDL	.	BDL
JUL	BDL	BDL	.	BDL	.	BDL

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM BRITANNIA WATER TREATMENT PLANT 1987

WATER TREATMENT PLANT			DISTRIBUTION SYSTEM			
SITE TYPE	TREATED	SITE 1		SITE 2		
		STANDING	FREE FLOW	STANDING	FREE FLOW	
AUG	BDL	BDL	.	BDL	.	BDL
SEP	BDL	BDL	.	BDL	.	BDL
OCT	BDL	BDL	.	.100 UCS	.	BDL
NOV	BDL	BDL	.	BDL	.	BDL
DEC	BDL	BDL	.	BDL	.	BDL

TOTL TRIHALOMETHANES (UG/L)		DET'N LIMIT = 0		GUIDELINE = 350.0 (A1)		
JAN	BDL	91.000	.	77.000	.	85.000
FEB	BDL	55.000	.	51.000	.	60.000
MAR	BDL	71.000	.	63.000	.	63.000
APR	.200	74.000	.	76.000	.	77.000
MAY	BDL	111.700	.	92.250	.	101.750
JUN	BDL	135.200	.	117.800	.	138.600
JUL	.800	173.900	.	158.600	.	173.400
AUG	BDL	153.600	.	153.100	.	153.200
SEP	BDL	173.700	.	163.100	.	173.100
OCT	.900	164.300	.	139.700	.	154.900
NOV	.200	175.500	.	166.400	.	142.400
DEC	.300 UCS	131.400	.	105.800	.	120.300

TABLE 6

DRINKING WATER SURVEILLANCE PROGRAM BRITANNIA WATER TREATMENT PLANT 1987

COUNT OF PARAMETERS NOT FOUND ABOVE THE DETECTION LIMIT

SCAN	PARAMETER	ANALYSED	DETECTION LIMIT	GUIDELINE
CHEMISTRY (LAB)	CYANIDE	48	0.001	.200 (A1) MG/L
METALS	ARSENIC	72	0.001	.050 (A1) MG/L
	CYANIDE	48	0.001	.200 (A1) MG/L
	SELENIUM	72	0.001	.010 (A1) MG/L
CHLOROAROMATICS	123 TRICHLOROBENZENE	48	5.000	10000. (I) NG/L
	1234 T-CHLOROBENZENE	48	1.000	10000. (I) NG/L
	OCTACHLOROSTYRENE	48	1.000	N/A NG/L
	PENTACHLOROBENZENE	48	1.000	74000. (D4) NG/L
	245 TRICHLOROTOLUENE	48	5.000	N/A NG/L
	26A TRICHLOROTOLUENE	48	5.000	N/A NG/L
CHLOROPHENOLS	234 TRICHLOROPHENOL	3	50.	N/A NG/L
	2345 T-CHLOROPHENOL	3	50.	N/A NG/L
	2356 T-CHLOROPHENOL	3	50.	N/A NG/L
	245-TRICHLOROPHENOL	3	50.	2600000(D4) NG/L
	PENTACHLOROPHENOL	3	50.	10000. (C1) NG/L
PAH	PHENANTHRENE	8	0	N/A NG/L
	ANTHRACENE	8	0	N/A NG/L
	FLUORANTHENE	8	0	42000 (D4) NG/L
	PYRENE	8	0	N/A NG/L
	BENZO(A)ANTHRACENE	8	0	N/A NG/L
	CHRYSENE	8	0	N/A NG/L
	DIMETH. BENZ(A)ANTHR	8	0	N/A NG/L
	BENZO(E)PYRENE	8	0	N/A NG/L
	BENZO(J) FLUORANTHEN	8	N/A	N/A NG/L
	BENZO(B) FLUORANTHEN	8	0	N/A NG/L
	PERYLENE	8	0	N/A NG/L
	BENZO(K) FLUORANTHEN	8	N/A	N/A NG/L
	BENZO (A) PYRENE	8	0	10 (B1) NG/L
	BENZO(G,H,I) PERYLEN	8	0	N/A NG/L
	DIBENZO(A,H) ANTHRAC	8	0	N/A NG/L
	INDENO(1,2,3-C,D) PY	8	0	N/A NG/L
	BENZO(B) CHRYSENE	8	0	N/A NG/L
	ANTHANTHRENE	8	N/A	N/A NG/L
	CORONENE	8	0	N/A NG/L
PESTICIDES & PCB	ALDRIN	48	1.000	700.0 (A1) NG/L
	BETA BHC	48	1.000	300. (G) NG/L
	ALPHA CHLORDANE	48	2.000	7000.0 (A1) NG/L
	GAMMA CHLORDANE	48	2.000	7000.0 (A1) NG/L
	DIELDRIN	48	2.000	700.0 (A1) NG/L
	METHOXYCHLOR	48	5.000	100000. (A1) NG/L
	THIODAN I	48	2.000	74000. (D4) NG/L
	THIODAN II	48	4.000	74000. (D4) NG/L
	ENDRIN	48	4.000	200.0 (A1) NG/L
	THIODAN SULPHATE	48	4.000	N/A NG/L
	HEPTACHLOR EPOXIDE	48	1.000	3000.0 (A1) NG/L
	HEPTACHLOR	48	1.000	3000.0 (A1) NG/L

TABLE 6

DRINKING WATER SURVEILLANCE PROGRAM BRITANNIA WATER TREATMENT PLANT 1987

COUNT OF PARAMETERS NOT FOUND ABOVE THE DETECTION LIMIT

SCAN	PARAMETER	ANALYSED	DETECTION LIMIT	GUIDELINE
-----	-----	-----	-----	-----
PESTICIDES & PCB	MIREX	48	5.000	N/A NG/L
	OXYCHLORDANE	48	2.000	N/A NG/L
	OPDDT	48	5.000	30000. (A1) NG/L
	PCB	48	20.000	3000. (A2) NG/L
	PP-DDD	48	5.000	N/A NG/L
	PPDDT	48	5.000	30000. (A1) NG/L
	ATRATONE	46	50.	N/A NG/L
	ALACHLOR	46	500.	35000. (D2) NG/L
	ETHYLENE DIBROMIDE	48	0	50.0 (G) UG/L
	HCB	48	1.000	10.0 (C1) NG/L
SPECIFIC PESTICIDES	TOXAPHENE	48	N/A	5000. (A1) NG/L
	AMETRYNE	46	50.00	300000. (D3) NG/L
	ATRAZINE	46	50.00	60000. (B3) NG/L
	BLADEX	46	100.00	10000. (B3) NG/L
	PROMETONE	46	50.00	52500. (D3) NG/L
	PROPACINE	46	50.00	16000. (D2) NG/L
	PROMETRYNE	46	50.00	1000. (B3) NG/L
	SENCOR	46	100.00	80000. (B2) NG/L
	SIMAZINE	46	50.00	10000. (B3) NG/L
	2,4,5-T	3	50.00	35000. (D2) NG/L
	2,4-D	3	100.00	100000. (A1) NG/L
	24DCHLORPHENOXYBUTYRC	3	200.00	18000. (B3) NG/L
	2,4-DP	3	100.00	N/A NG/L
	DICAMBA	3	100.00	87000. (B3) NG/L
	PICHLORAM	3	100.00	2450000 (D3) NG/L
	SILVEX	3	50.00	10000. (A1) NG/L
	DIAZINON	3	20.	14000. (A1) NG/L
	DICHLOROVOS	3	20.	N/A NG/L
	DURSBAN	3	20.	N/A NG/L
	ETHION	3	20.	35000. (G) NG/L
	GUTHION	3	N/A	N/A NG/L
	MALATHION	3	20.	160000. (G) NG/L
	MEVINPHOS	3	20.	N/A NG/L
	METHYL PARATHION	3	50.	7000. (B3) NG/L
	METHYLTRITHION	3	20.	N/A NG/L
	PARATHION	3	20.	35000. (B1) NG/L
	PHORATE	3	20.	35.0 (D2) NG/L
	RELDAN	3	20.	N/A NG/L
	RONNEL	3	20.	N/A NG/L
	AMINOCARB	3	N/A	N/A NG/L
	BENOMYL	3	N/A	N/A NG/L
	BUX	3	2000.	N/A NG/L
	CARBOFURAN	3	2000.	18000. (D3) NG/L
	CIPC	3	2000.	350000. (G) NG/L
	DIALATE	3	2000.	30000. (H) NG/L
	EPTAM	3	2000.	N/A NG/L
	IPC	3	2000.	N/A NG/L
	PROPOXUR	3	2000.	90000. (G) NG/L
	SEVIN	3	200.	70000. (A1) NG/L
	SUTAN	3	2000.	245000. (D3) NG/L
	METOLACHLOR	46	500.	50000. (B3) NG/L

TABLE 6

DRINKING WATER SURVEILLANCE PROGRAM BRITANNIA WATER TREATMENT PLANT 1987

COUNT OF PARAMETERS NOT FOUND ABOVE THE DETECTION LIMIT

SCAN ----	PARAMETER -----	ANALYSED -----	DETECTION LIMIT -----	GUIDELINE -----
VOLATILES	DICHLOROMETHANE	48	0	1750. (D3) UG/L
	T1,2DICHLOROETHYLENE	48	0	350. (D3) UG/L
	1,1 DICHLOROETHANE	48	0	N/A UG/L
	111, TRICHLOROETHANE	48	0	200. (D1) UG/L
	1,2 DICHLOROETHANE	48	0	5.0 (D1) UG/L
	1,2 DICHLOROPROPANE	48	0	10.0 (G) UG/L
	TRICHLOROETHYLENE	48	0	5.0 (D1) UG/L
	112 TRICHLOROETHANE	48	0	.60 (D4) UG/L
	BROMOFORM	48	0	350.0 (A1+) UG/L
	1122 T-CHLOROETHANE	48	0	0.17 (D4) UG/L
	CHLOROBENZENE	48	0	1510. (D3) UG/L
	1,3 DICHLOROBENZENE	48	0	130. (G) UG/L
	1,2 DICHLOROBENZENE	48	0	130. (G) UG/L
	TRIFLUOROCHLOROTOLUE	48	0	N/A UG/L
	ETHYLENE DIBROMIDE	48	0	50.0 (G) UG/L

Appendix A

DRINKING WATER SURVEILLANCE PROGRAM

The Drinking Water Surveillance Program (DWSP) for Ontario monitors drinking water quality at municipal water supply systems. The DWSP Database Management System provides a computerized drinking water quality information system for the supplies monitored. The objectives of the program are to provide:

- immediate, reliable, current information on drinking water quality,
- a flagging mechanism for 'Objective' exceedence,
- a definition of contaminant levels and trends,
- a comprehensive background for remedial action,
- a framework for assessment of new contaminants,
- and an indication of treatment efficiency of plant processes.

Program

The DWSP officially began in April 1986 and is designed to eventually include all municipal water supplies in Ontario; currently 44 plants are being monitored. Water supply locations have been prioritized for surveillance, based primarily on criteria such as population density, probability of contamination and geographical location.

An ongoing assessment of future monitoring requirements at each location will be made. Monitoring will continue at the initial locations at an appropriate level and further locations will be phased into the program as resources permit. It is estimated that after 4 years of operation, the program will be monitoring 90 locations.

A major goal of the program is to collect valid water quality data, in context with plant operational characteristics at the time of sampling. As soon as sufficient data have been accumulated and analysed, both the frequency of sampling and the range of parameters may be adjusted accordingly.

Assessments are carried out at all locations prior to initial sampling in order to acquire complete plant process and distribution system details, and to designate (and retrofit if necessary) all sampling systems and locations. This ensures that the sampled water is a reflection of the water itself.

Samples are taken of the raw (ambient water) and the treated water at the treatment plant, and of consumer's tap water in the distribution system. In order to determine possible effects of distribution on water quality, both standing and free flow water in old and new sections of the distribution system are sampled.

Sampling is carried out by operational personnel who have been trained in the applicable procedures.

Comprehensive standardized procedures and Field Test kits are supplied to sampling personnel. This ensures that samples are taken and handled according to standard protocols and that field testing will supply reliable data. All field and laboratory analyses are carried out using "approved documented procedures". All laboratory analyses are carried out by the MOE Laboratory Services Branch.

Data Reporting Mechanism

When the analytical results are transferred from the MOE laboratory into the DWSP system, printouts of the completed analyses are sent to the MOE District Officer, the appropriate operational staff and are also retained by the DWSP co-ordinator.

DWSP INPUTS AND OUTPUTS

The DWSP INPUTS and OUTPUTS are illustrated in Fig. 1.

PROGRAM INPUTS

PLANT AND DISTRIBUTION SYSTEM DESCRIPTION

The system description includes plant specific non-analytical information acquired through a questionnaire and initial plant visit. During the initial assessment of the plant and distribution system the questionnaire content is verified and

missing information added. It is intended that all data be kept current with scheduled annual updates.

The PLANT and DISTRIBUTION SYSTEM DESCRIPTION consists of the following seven components.

1. Process component inventory

All physical and chemical processes that the water is subjected to, from the intake pipe to the consumers' tap (where possible), are documented. These include: process type, general description of physical structures, material types, sizes, and retention time for each process within the plant. The processes may be as simple as transmission or as complex as carbon adsorption.

2. Treatment chemicals

Chemicals used in the treatment processes, their function, application point, supplier and brand-name are recorded. The chemical dosages applied on the day of sampling are recorded in DWSP.

3. Process control measurements

Documentation of in-plant monitoring of process parameters (turbidity, chlorine residuals, pH, aluminum residuals) including methods used, monitoring locations and frequency is contained in this section. In-plant monitoring results are generally not retained in DWSP but are retained by the Water Treatment Plant.

4. Design flow and retention time

The hydraulic capacity, designed and actual, is noted here. Retention time (the time that a block of water is retained in the plant) is also noted. The maximum, minimum and average flow as well as a record of the flow rate on the day of sampling are recorded in DWSP.

5. Distribution system description

This area includes the storage and transmission characteristics of the distribution system after the water leaves the plant.

6. Sampling system

Each plant is assessed for its adequacy in terms of sampling of bacteriological, organic and inorganic parameters. The prime considerations in the assessment and design of the sampling system are:

- i/ the sample is an accurate representation of the actual water condition, eg. raw water has had no chemical treatment;
- ii/ the water being sampled is not being modified by the sampling system;
- iii/ the sample tap must be in a clean area of the plant, preferably a lab area;
- iv/ the sample lines must be organically inert (no plastic, ideally stainless steel).

It is imperative that the sampled water be a reflection not of the sampling system but of the water itself.

The sampling system documentation includes: origin of the water; date sampling was initiated; size, length and material type (intake, discharge and tap), pump characteristics (model, type, capacity) and flow rate.

7. People

This section contains the names, addresses and phone numbers of current plant management and operational staff, distribution system management and operational staff, Medical Officer of Health and appropriate Ministry of Environment personnel associated with the plant.

FIELD DATA

The second major input to DWSP is field data.

Field data is collected at the plant and from the distribution system sites on the day of sampling. The field data consists of general operating conditions and the results of testing for field parameters. General operating conditions include chemicals used, dosages, flow and retention time on the day of sampling as well as monthly maximum, minimum and average flows. Field parameters include turbidity, chlorine residuals (free, combined and total), temperature and pH. These parameters are analysed according to standardized DWSP protocols to allow for interplant comparison.

LABORATORY ANALYTICAL DATA

The third major input to DWSP is Laboratory Analytical Data.

Samples gathered from the raw, treated and distribution sampling sites are analyzed for approximately 160 parameters at a frequency of two to twelve times per year. Sixty-five percent of the parameters are organic. The parameters measured may have health or aesthetic implications when present in drinking water. Many of the parameters may be used in the treatment process or may be treatment by-products. Due to the nature of certain analytical instruments parameters may be measured for in a "scan" producing some results for parameters that are not on the DWSP priority list but which may be of interest. The majority of the parameters are measured on a routine basis however, those that are technically more difficult and/or costly to analyse for are done less frequently. These include Specific Pesticides and Chlorophenols.

Although the parameter list is extensive, additional parameters with the potential to cause health or aesthetic related problems may be added provided reliable analytical and sampling methods exist.

All laboratory generated data is derived from standardized, documented analytical protocols. The analytical method is an integral part of the data and as methods change notation will be made and intercomparison data documented.

PARAMETER REFERENCE INFORMATION

The fourth major input to DWSP is Parameter Reference Information

This is a catalogue of information for each substance analysed on DWSP. It includes parameter name and aliases, physical and chemical properties, basic toxicology, world-wide health limits, treatment methods and uses. The Parameter Reference Information is computerized and can be accessed through the Query function of the DWSP database.

An example is shown in fig. 2.

A written copy (hard version) of the Parameter Reference Information will be available in the near future and is a new and sophisticated enhancement to the DWSP.

PROGRAM OUTPUTS

There are four major program outputs, Query, Action Alert, Report Generation and the Annual Report.

QUERY

All DWSP information is easily accessed through the Query function, therefore anything from addresses of plant personnel to complete water quality information for a plant's water supply is instantly available. The DWSP computer system makes relatively complex inquiries manageable. A personal password allowing access into the DWSP query mode in all MOE offices is being developed by the DWSP group.

ACTION ALERTS

Drinking Water quality in Ontario is evaluated against provincial objectives as outlined in the publication, Ontario Drinking Water Objectives (ISBN 0-7729-2725-1 revised 1983). This publication contains health-related Maximum Acceptable Concentrations for thirty substances. Should the reported level of a substance in treated water exceed the Ontario Drinking Water Objective an "Action Alert" requiring resampling and confirmation is issued. This assures that operational staff, health authorities and the public are notified as soon as possible of confirmation of an exceedance and remedial action taken. This report supplies a history of the occurrence of past exceedences at the plant plus a historical summary on the parameter of concern.

In the absence of Ontario Drinking Water Objectives, other agency guidelines which are documented in the Parameter Reference Information may be used. If these guidelines are exceeded the results are flagged and evaluated by DWSP personnel. An "Action Alert" will be issued if warranted.

REPORT GENERATION

Custom reports can be generated from DWSP to meet the needs of the regions and to respond to public requests.

ANNUAL REPORTS

It is the practice of DWSP to produce an annual report containing analytical data along with companion plant information.

FIG. 1

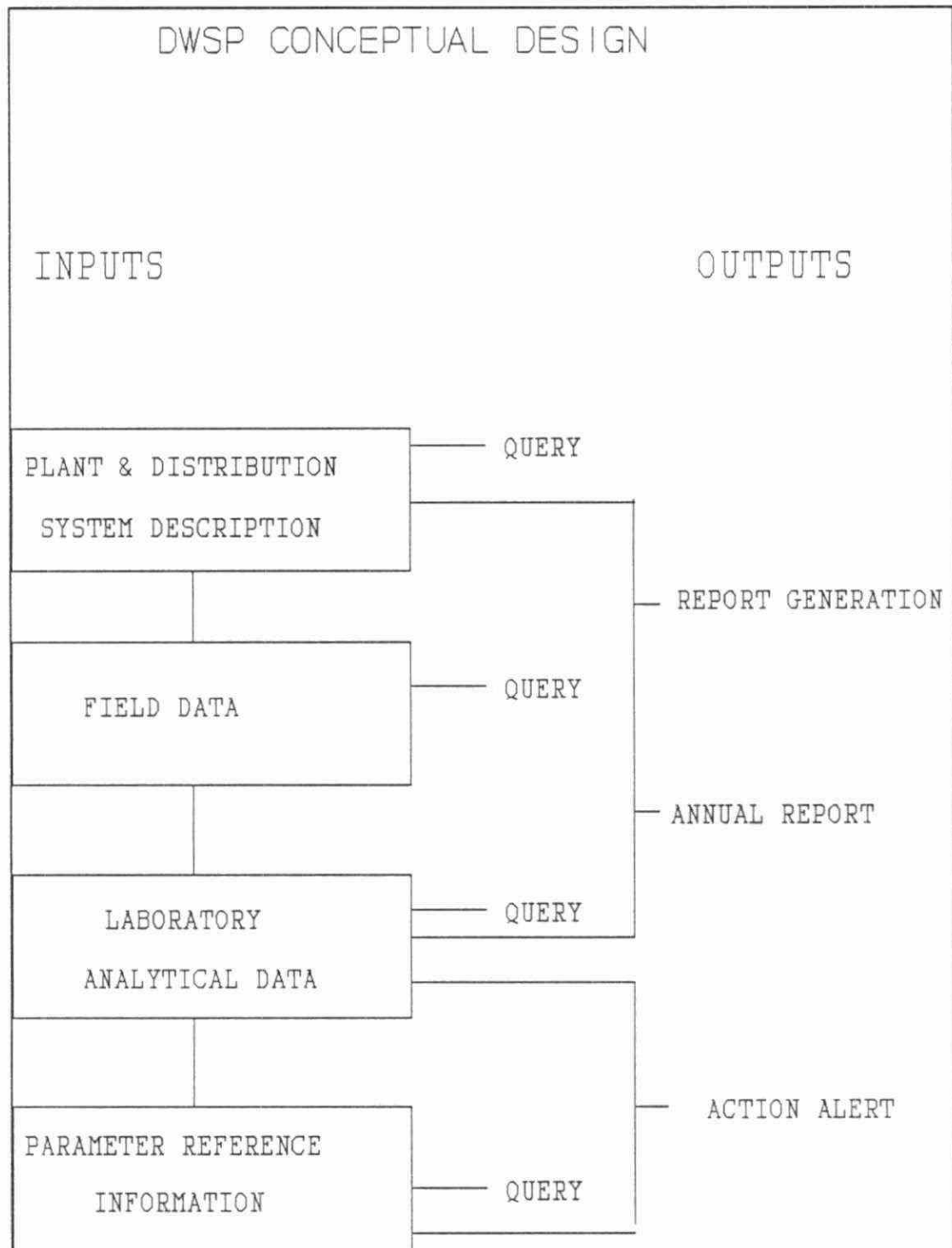


FIG.2

MOE - DRINKING WATER ASSESSMENT PROGRAM (DWSP)

(B2001P)
REFERENCE
BENZENE

PARAMETER

SOURCE FROM	TO	METHOD	TARG	UNIT	NOTE
EPA C 86/04		NOMETH	.00	063000 UG/L	RMCL
EPAA C 80/11		NOMETH	6.60	063000 UG/L	
FERC C 84/05		NOMETH	1.00	063000 UG/L	
WHO C 84/01		NOMETH	10.00	064000 UG/L	

DESCRIPTION: NAME: BENZENE

CAS#: 71432

MOLECULAR FORMULAE: C_6H_6

DETECTION LIMIT: (FOR METHOD POCODO) 0.05 UG/L

SYNONYMS: BENZOLE, COAL NAPHTHA, CARBON OIL (27),
CYCLOHEXATRIENE (41)CHARACTERISTICS: COLOURLESS TO LIGHT YELLOW, MOBILE,
NON-POLAR LIQUID, OF HIGHLY REFRACTIVE NATURE,
AROMATIC, VAPOURS BURN WITH SMOKING FLAME (30)

PROPERTIES:

SOLUBILITY IN WATER: 1780-1800 MG/L AT 25 DEG C (41)

THRESHOLD ODOUR: NO DATA

THRESHOLD TASTE: 0.5 MG/L IN WATER (39)

ENVIRONMENTAL FATE: MAY BIOACCUMUALTE IN LIVING
ORGANISMS, APPEARS TO BIOACCUMULATE IN ANIMAL
TISSUES THAT EXHIBIT HIGH LIPID CONTENT OR ARE
MAJOR METABOLIC SITES (LIVER, BRAIN), SMALL
QUANTITIES EVAPORATE FROM SOIL OR DEGRADE QUICKLYSOURCES: PETROLEUM REFINING, SOLVENT RECOVERY, COAL
TAR DISTILLATION, FOOD PROCESSING, TANNING.USES: PREPERATION OF ETHYL BENZENE USED AS A STYRENE
MONOMER, DETERGENTS, NYLON, AS INTERMEDIATE INPESTICIDE PRODUCTION, SOLVENT IN RUBBER INDUSTRY,
DEGREASING AND CLEANSING AGENT, GASOLINE.TOXICITY: RATING 4 (VERY TOXIC); ACUTE - IRRITATES
MUCOUS MEMBRANES, SYMPTONS INCLUDE RESTLESSNESS,
CONVULSIONS, DEPRESSION, RESPIRATORY FAILURE;
CHRONIC - ANEMIA AND LEUKEMIA (45).

CARINOGENICITY: HUMAN CARCINOGEN AND MUTAGEN

REMOVAL: GAC ADSORPTION, PRECIPITATION WITH ALUM
FOLLOWED BY SEDIMENTATION, COAGULATION AND
FLOCCULATION, SOLVENT EXTRACTION, OXIDATION (41).

MOLECULAR WEIGHT: 78.12 GRAMS

MELTING POINT: 5.5 DEGREES C (27)

BOILING POINT: 80.1 DEGREES C (27)

SPECIFIC GRAVITY: 0.879 AT 20 DEGREES C (27)

VAPOUR PRESSURE: 100 MM AT 26.1 DEGREES C

HENRY'S LAW CONSTANT: 0.00555 ATM M_2 /MOLE

LOG OCT./WATER PAR.COEFF:K=1.0 1/N=1.6 R=.97 PH=5.3

Appendix B

DWSP SAMPLING GUIDELINE

i) RAW and TREATED at PLANT

General Chemistry	-500 mL clear plastic bottle -rinse bottle with sample three times and discard water -fill to line
Bacti	-250 mL clear glass bottle with white seal on cap -do <u>not</u> rinse bottle; preservative has been added -avoid touching bottle neck or inside of cap -fill to top of red label as marked
Metals	-500 mL clear plastic bottle with white lid -rinse bottle and cap three times, discard -fill to line -add 10 drops nitric acid (Caution: HNO_3 is corrosive)
Volatiles (OPOPUP)	-250 mL clear glass bottle -do <u>not</u> rinse bottle -tilt bottle when filling -fill bottle completely; there should be no air bubbles.
Organic (OWOC), (OWTRI), (OAPAHX)	-1 liter brown glass bottle per scan -do <u>not</u> rinse bottle -fill to approx. 1" from top -when 'special pesticides' are requested three extra bottles per sample must be submitted
Cyanide -	-500 mL clear plastic bottle -do <u>not</u> rinse bottle -fill to approx. 1" from top -add 10 drops sodium hydroxide (Caution: NaOH is corrosive)

Mercury

- 250 mL clear glass bottle
- rinse bottle and cap three times, discard then fill to top of label
- add 20 drops each nitric acid and potassium dichromate
- (**Caution:** HNO_3 and KCrO_7 corrosive)

Phenols

- 250 mL clear glass bottle
- do not rinse bottle
- fill to top of label as marked

Steps

1. Let cold water tap run for several minutes.
2. Record time in submission sheet.
3. Record teperature on submission sheet.
4. Fill up all bottles as per instructions.
5. Record chlorine residuals (free, combined and total for treated water only), turbidity and pH on submission sheet.

ii) Distribution Samples (standing water)

General Chemistry	-500 mL clear plastic bottle -rinse bottle with sample three times and discard -fill to line
Metals	-500 mL clear plastic bottle with white lid -rinse bottle and cap three times, discard -fill to line -add 10 drops nitric acid (Caution: HNO_3 is corrosive)

Steps:

1. Record time on submission sheet.
2. Place bucket under tap and open cold water.
3. Fill to predetermined volume.
4. After mixing the water, record the temperature on the submission sheet.
5. Fill general chemistry and metals bottles.
6. Record chlorine residuals (free, combined and total), turbidity and pH on submission sheet.

iii) Distribution Samples (free flow)

General Chemistry	-500 mL clear plastic bottle -rinse bottle with sample three times and discard water -fill to line
Bacteri	-250 mL clear glass bottle with white seal on cap -do <u>not</u> rinse bottle; preservative has been added -avoid touching bottle neck or inside of cap -fill to top of red label as marked
Metals	-500 mL clear plastic bottle with white lid -rinse bottle and cap three times, discard -fill to line -add 10 drops nitric acid (Caution: HNO_3 is corrosive)
Volatiles (OPOPUP)	-250 mL clear glass bottle -do <u>not</u> rinse bottle; preservative has been added -tilt bottle when filling -fill bottle completely; there should be no air bubbles
Organic (OWOC), (OWTRI)	-1 liter brown glass bottle per scan -do <u>not</u> rinse bottle: preservative has been added -fill to approx. 1" from top
Cyanide	-500 mL clear plastic bottle -do <u>not</u> rinse bottle: preservative has been added -fill to approx. 1" from top -add 10 drops sodium hydroxide (Caution: NaOH is corrosive)
Mercury	-250 mL clear glass bottle -rinse bottle and cap three times, discard then fill to top of label -add 20 drops each nitric acid and potassium dichromate (Caution: HNO_3 and KCrO_7 corrosive)

Steps:

1. Record time on submission sheet.
2. Let cold water flow for ten minutes.
3. Record temperature on submission sheet.
4. Fill all bottles as per instructions.
5. Record chlorine residuals (free, combined and total), turbidity and pH on submission sheet.

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treatment plant : drinking water
surveillance program - annual
report 1987 /
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